PowerBook G3 Series (Bronze Keyboard)

Basics

PowerBook G3 Series (Bronze Keyboard)

Product Overview

The newest PowerBooks in the PowerBook G3 Series combine all the features of the previous PowerBook G3 Series computers in a slimmer, lighter design.

To differentiate this model from earlier models, check for the bronze see-through keyboard and a small, white Apple logo on the inside top of the display bezel.

Features

The features of the PowerBook G3 Series (Bronze Keyboard) include:

- PowerPC G3 microprocessor running at clock speeds of 333 or 400 MHz
- Backside L2 cache of up to 1 MB of fast static RAM
- Two standard SO-DIMM expansion slots for SDRAM modules and 64 MB minimum of SDRAM installed, expandable to 384 MB total
- Built-in hard drive of 4 or 6 GB
- 14.1-inch TFT display with XGA resolution (1024 x 768 pixels)
- Standard VGA video connector for external video monitor with XGA resolution, and S-video connector that supports PAL and NTSC video monitors
- 8 MB of video SDRAM

- Built-in 2D and 3D graphics acceleration via video circuits
- Two hot-swappable expansion bays for two batteries or one battery and one CD-ROM drive, DVD-ROM drive, or other IDE or PCI device
- One CardBus slot that accepts one Type II CardBus card or PC Card
- Two USB ports for external keyboard, mouse, and other USB devices
- One SCSI port with HDI-30 connector
- Built-in Ethernet port with RJ-45 connector for 10BaseT and 100Base-TX operation
- Infrared link for up to 4 Mbit-per-second IrDA data transfer
- Built-in modem with 56 Kbps data rate
- Built-in microphone and speakers as well as a line-level stereo input jack and a stereo headphone jack

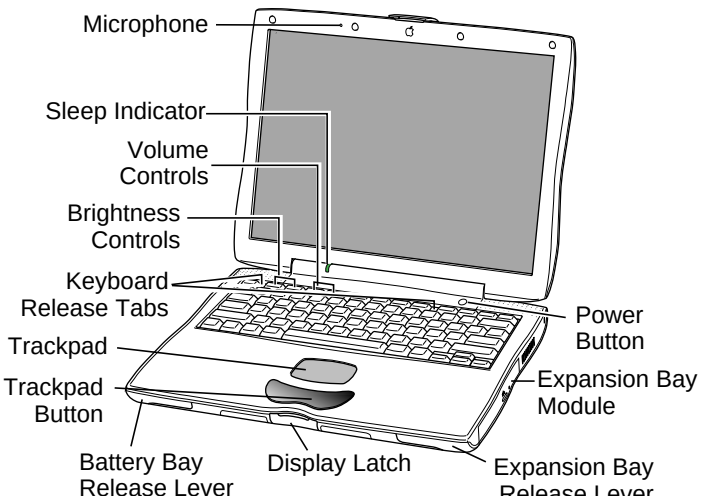
- Keyboard with embedded numeric keypad and inverted-T arrow keys. Some function keys control the display and speakers
- Trackpad with tap/double tap and drag features

System Configurations

At introduction in May 1999, two basic configurations of the PowerBook G3 Series (Bronze Keyboard) are available. With configure-to-order options, customers may customize their computers in a variety of ways. For more information on configurations and configure-to-order options, see the Specifications chapter of this manual.

PowerBook G3 Series (Bronze Keyboard) Configurations Introduced May 1999

	M7304	M7308
Display	14.1 TFT	14.1 TFT
Processor Speed	333 MHz	400 MHz
Backside L2 Cache	512k	1 MB
Memory (SDRAM)	64 MB	64 MB
Video (SGRAM)	8 MB	8 MB
Hard Drive	4 GB IDE	6 GB IDE
CD-ROM Drive	Yes	No
DVD-ROM Drive	No	Yes
K56flex Modem	Yes	Yes
S-video Out	Yes	Yes



View of Front and Right Side

The front of the computer includes the: microphone, sleep indicator, volume and brightness controls, keyboard release tabs, trackpad and trackpad button, battery bay release lever, display latch, and expansion bay release lever.

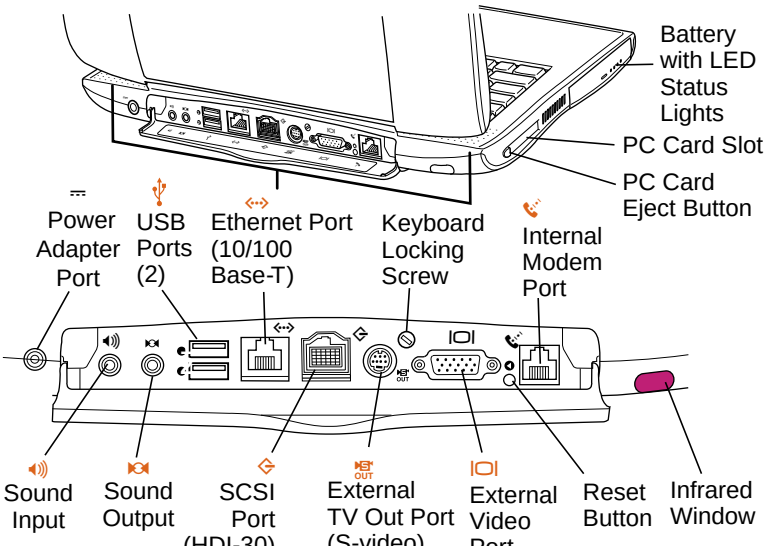
The right side includes the: expansion bay release lever and the power button.

View of Rear and Left Side

The rear of the computer includes the: power adapter port, sound output, sound input, two USB ports, Ethernet (10/100 Base-T), SCSI port (HDI-30), external TV out port (S-video), keyboard locking screw, external video port, reset button, internal modem port, and infrared window.

The left side includes the PC card eject button, PC Card slot, and battery bay.

The rear and left side of the computer is pictured on the following page.



PowerBook G3 Series (Bronze Keyboard) Rear View

System Software—NewWorld ROM

The PowerBook G3 Series (Bronze Keyboard) is different from previous Macintosh PowerBook computers in that it has no single, large ROM that contains many components of the Mac OS software, the 68K emulator, hardware initialization, and the nanokernel. Instead, a small ROM provides hardware initialization functions and provides a mechanism to load the Mac OS ROM image into RAM. The new software architecture that is centered around ROM-in-RAM and its ramifications has the code name NewWorld.

ROM-in-RAM

Hardware-specific code resides in firmware (ROM) that fits into one ROM called the boot ROM. The boot ROM includes the code and tables needed to start up the computer, load an

operating system, and provide common hardware access services.

All higher-level software resides in what has been historically known as the Mac OS ROM, but with much of the old hardware-specific code moved into the boot ROM. As before, the Mac OS ROM can still be augmented by enablers, the System file, and extensions.

Prior to the iMac, all Macintosh computers required a ROM component that contained many components of the Mac OS software. The NewWorld approach sidesteps this requirement by copying an image of the Mac OS ROM into RAM before the Mac OS begins operation. Once the Mac OS begins operation, a Mac OS ROM image in RAM and an actual Mac OS ROM behave in the same way. No new or different software interfaces are directly accessible from the Mac OS.

During the boot process, software contained in the Mac OS

ROM file communicates with Open Firmware to collect information about the hardware, using the Open Firmware Client Interface.

Performance

Performance of a PowerBook computer using ROM-in-RAM should exceed performance measurements for other Macintosh computers with comparable CPUs and speeds due to the improved interrupt handling with the NewWorld approach. In addition, performance is improved due to executing code that normally exists in ROM-in-RAM, because the RAM devices operate faster than the ROM devices normally used.

RAM Footprint

Because the Mac OS ROM image is stored in RAM, approximately 3 MB of RAM is removed from availability for other uses. In effect, a system with 64 MB of RAM appears to have only 61 MB available. Some portion of the missing 3 MB is offset by having fewer patches in RAM.

Data Structures and Files

The Mac OS ROM image is contained in a new file, named Mac OS ROM, that is kept in the System Folder. The Mac OS ROM image is exactly the same as it would be if it were an actual Mac OS ROM, containing the high-level software, the kernel software, and the 68K emulator.

Startup Disk Control Panel

Previous systems stored the user's selected startup device in Parameter RAM (PRAM) when the user selected a device in the Startup Disk control panel. This device was honored by the Mac OS ROM unless the selected device was unavailable or was overridden by the user.

The startup disk routine for the PowerBook computer, rather than setting Mac OS PRAM, sets an Open Firmware config variable called boot-device. This setting is honored by Open Firmware unless the selected device is unavailable or is overriden by the user.

The following keys can be pressed to override the selected startup device:

- Command-Option-Shift-Delete: ignore the boot-device setting and scan for alternate devices
- C: force the internal CD-ROM drive to be the startup

device

- D: force the internal hard drive to be the startup device.

Open Firmware and Startup Devices

In order for a device supported by a PCI expansion card to participate in the startup process, the card must include an expansion ROM containing startup firmware. Expansion cards for startup devices must contain all the driver code required during startup in the expansion ROM on the card. Depending on their functions, such cards may also need to provide support resources such as fonts.

Examples of devices needed during system startup include display, keyboard, mouse devices, and storage devices such as hard drives and CD-ROM drives.

Important: If Open Firmware code is not included in the

expansion card for a startup device, the card will not be usable until the operating system loads its supporting software from the startup device after the startup process has concluded.

Hard Disks and HFS Plus

The PowerBook G3 Series (Bronze Keyboard) hard drives use Mac OS Extended format (HFS Plus). Some disk utility and disk locking programs manufactured by companies other than Apple are incompatible with HFS Plus.

Using an incompatible disk utility or disk locking program could result in hard drive corruption and loss of all data on the hard disk. Check the documentation that came with the program or contact the manufacturer or the vendor of the program before attempting to use it. Apple recommends using the utility Disk First Aid, which is included on the system software CD that ships with the PowerBook G3 Series (Bronze Keyboard).

Norton Utilities

Warning: Norton Utilities for Macintosh, v3.5.2 and 3.5.3 will not run on any of the PowerBook G3 Series computers. Running versions 3.5.1 and below may cause hard drive corruption and loss of all data on the hard drive. See the Symantec Web site at http://www.symantec.com/nu/num-hfs.html for more information on Norton Utilities and Mac OS Extended format.

SCSI Disk Mode

To use a PowerBook in SCSI disk mode, the computer you are connecting to must be running Mac OS 8.1 or later. If the computer is running an earlier version of system software, no user files will be visible on the PowerBook hard drive.

With NewWorld ROM, a valid system image must exist on the PowerBook hard drive for SCSI disk mode to work.

In addition, SCSI disk mode is set to SCSI ID 2 only and cannot be changed.

USB Ports

The PowerBook G3 Series (Bronze Keyboard) has two Universal Serial Bus (USB) ports that can be used to connect I/O devices such as a USB mouse, printers, scanners, and low-speed storage devices. The ports use USB Type A connectors, which have four pins.

The USB ports take the place of the ADB and serial I/O ports found on earlier PowerBook computers, but they do not function the same way.

- USB is a serial communications channel, but it does not replace LocalTalk functionality on Macintosh computers; you cannot connect two Macintosh computers using the USB. The best method for networking PowerBook computers is through the built-in Ethernet port.
- The Macintosh USB software does not support booting from an external USB storage device.

Ethernet Port

The PowerBook G3 Series (Bronze Keyboard) has a built-in 10/100 Mbps Ethernet port. When connected to either a 10Base-T or a 100Base-TX hub, the port will recognize which type of hub is connected.

The connector for the Ethernet port is a a short, shielded RJ-45 connector on the back of the computer.

Keyboard

The PowerBook G3 Series (Bronze Keyboard) keyboard includes a built-in numeric keypad and controls to adjust display brightness, speaker volume, and external audio port volume.

Several of the keys on the keyboard have more than one mode of operation. These changes are controlled by the Fn key, the Num Lock key, and the Function Keys checkbox in the Keyboard control panel.

Fn Key

Press the Fn key to:

- Toggle the function keys between their normal control functions and their alternate F1–F12 functions
- Select the embedded numeric keypad on the right portion of the alphanumeric keys
- Change certain control keys, including the cursor control keys, to page control keys.

Table 1 below shows the operations controlled by function keys when the Fn key is pressed.

Key	Operation
F1	Decrease display brightness
F2	Increase display brightness
F3	Decrease speaker volume

Key	Operation
F4	Increase speaker volume
F5	Num Lock
F6	Mute speaker

Table 1: Function Key Operation

Num Lock Key

Press the Num Lock key to:

- Select the embedded numeric keypad on the right portion of the alphanumeric keys
- Make the rest of the alphanumeric keys functionless

Function Keys Checkbox

The Function Keys checkbox is a checkbox in the Keyboard control panel that lets the user choose whether the function keys F1–F12 are primary or secondary.

Primary means the function keys default to their control functions when the Fn key is not depressed. Secondary means the function keys default to their F1–F12 functions when the Fn key is not depressed. In either case, pressing the Fn key reverses the functions of the function keys from the default functions set by the checkbox.

DVD-Video

Some configurations of the PowerBook G3 Series (Bronze Keyboard) have a built-in DVD decoder that provides video support for a DVD drive in the right expansion bay. This decoder provides MPEG-2 audio and video decoding as well as full NTSC and PAL decoding.

The Macintosh PowerBook DVD-Video Kit offered by Apple for earlier PowerBook G3 Series computers is not supported in this model. The DVD expansion bay module sold with the kit will not physically fit in this version of the PowerBook G3 Series.

Expansion Bay Modules

Expansion bays are not the same as those in previous PowerBook G3 Series computers. Expansion bay modules designed for earlier PowerBook computers will not fit in the expansion bays of the PowerBook G3 Series (Bronze Keyboard).

The left expansion bay accepts PowerBook G3 Series (Bronze Keyboard) batteries only. The right expansion bay accepts batteries and the wider 5.25-inch CD-ROM drive and DVD-ROM drive. When a smaller device is inserted, the expansion bay flip door covers the empty part of the bay.

Expansion bay modules may be removed while the PowerBook is turned on, in sleep, or shut down. Do not swap modules while the computer is starting up.

Battery Information

The Lithium Ion (LiIon) batteries used for the PowerBook G3 Series (Bronze Keyboard) are not compatible with any earlier PowerBooks, including others in the PowerBook G3 Series. The connector is physically different, and the battery is thinner than previous batteries.

LiIon batteries have battery level indicator lights that tell whether the battery is fully charged, three-fourths charged, one-half charged, one-fourth charged, or empty. To check the battery charge, press the status button located next to the status lights. The battery charges whenever the external AC adapter is connected.

If the battery lights blink, there is a problem with the battery. If only one light blinks, the battery is fully depleted and needs to be recharged.

Battery Handling Guidelines

Warning: Lilon batteries contain hazardous chemicals and should not be thrown out with household or office trash. Review battery handling and disposal instructions in Safety Information in Bulletins/Safety.

The following are guidelines for properly handling batteries:

- Handle the battery carefully. Do not drop, puncture, disassemble, mutilate, or incinerate it.
- Do not leave a battery in the computer for longer than a week without plugging in the power adapter.
- Do not short the battery contacts.
- Do not leave the battery in hot locations (such as the trunk of a car).
- Do not leave a battery in storage for longer than six months without recharging it.

- Never get batteries wet.
- Recharge batteries only as described in the user's manual and only in ventilated areas.

PC Card Handling

The PC Card slot accepts one Type I or Type II card. The slot supports both 16-bit PC Cards and 32-bit CardBus c ards. Cards can be removed and replaced while the computer is operating. The slot supports Zoomed Video on the card.

Previous PowerBook G3 Series computers featured an auto-eject mechanism for the PC Card slots.The PowerBook G3 Series (Bronze Keyboard) eject mechanism is manual. To operate it, first drag the PC Card icon (if present) to the trash. Then push once on the eject button to release the button, and a second time to eject the card.

The following are guidelines for properly handling PC Cards:

- Use only cards that are compatible with the PC Card unit. Refer to the compatibility information that came with the PC Card. If you cannot find the compatibility information,

contact the card vendor.

- Do not insert anything other than a PC Card into the card slots.
- The computer must be on or off to eject a PC Card. Do not eject a PC Card when the computer is in sleep mode.
- Before you eject a card, make sure nothing is blocking the card's slot.
- To use the card again immediately, pull it out about an inch more and then push it back in. If you don't follow this procedure and try to push the card back in to use it again, the card will not engage properly.
- Do not pull on a PC Card before it has been ejected out of the slot. Forcing a PC Card out of the slot may damage the computer or the card. If the card is partially ejected, use pliers to carefully pull the card out the rest of the way.

Boards and Cards

The architecture of the PowerBook G3 Series (Bronze Keyboard) is designed around two main circuit boards: the microprocessor board and the I/O logic board.

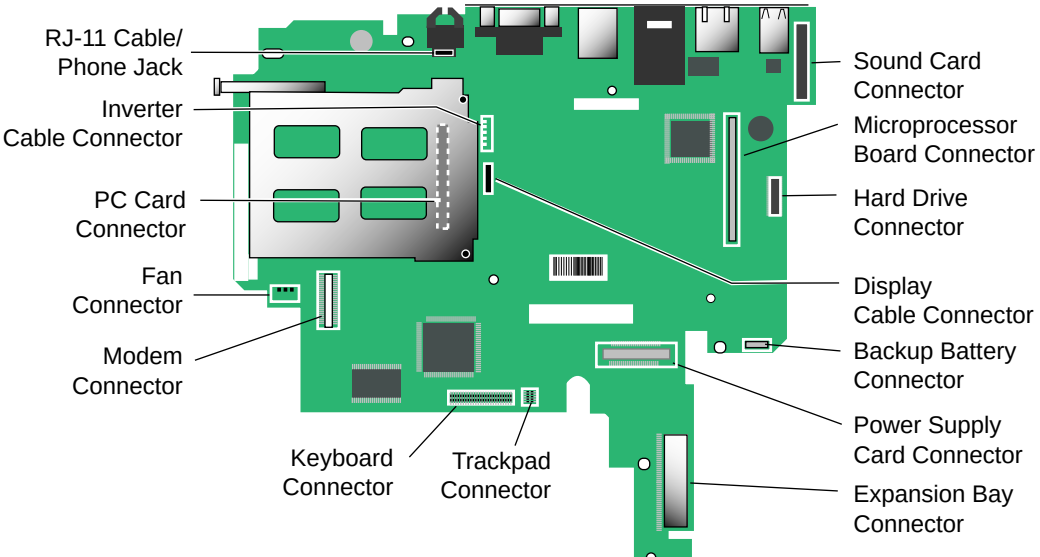
Besides the two main boards, the PowerBook G3 Series (Bronze Keyboard) can contain up to six cards: power supply card, sound card, RAM card (factory installed), RAM card (user installed), modem, and modem EMI filter.

The I/O logic board and microprocessor board are shown on the following pages.

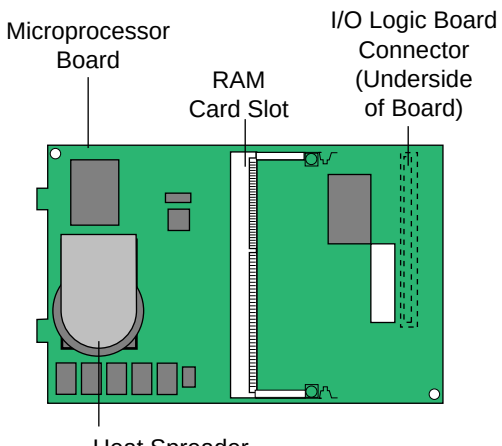
I/O Logic Board

The I/O logic board includes all the I/O interfaces, video and display support, and battery and expansion bays. The PCMCIA cardcage mechanism (CardBus slot), RJ-11 cable/phone jack, and reset button are separate parts that connect to the I/O logic board.

The I/O logic board is pictured on the next page.



I/O Logic Board

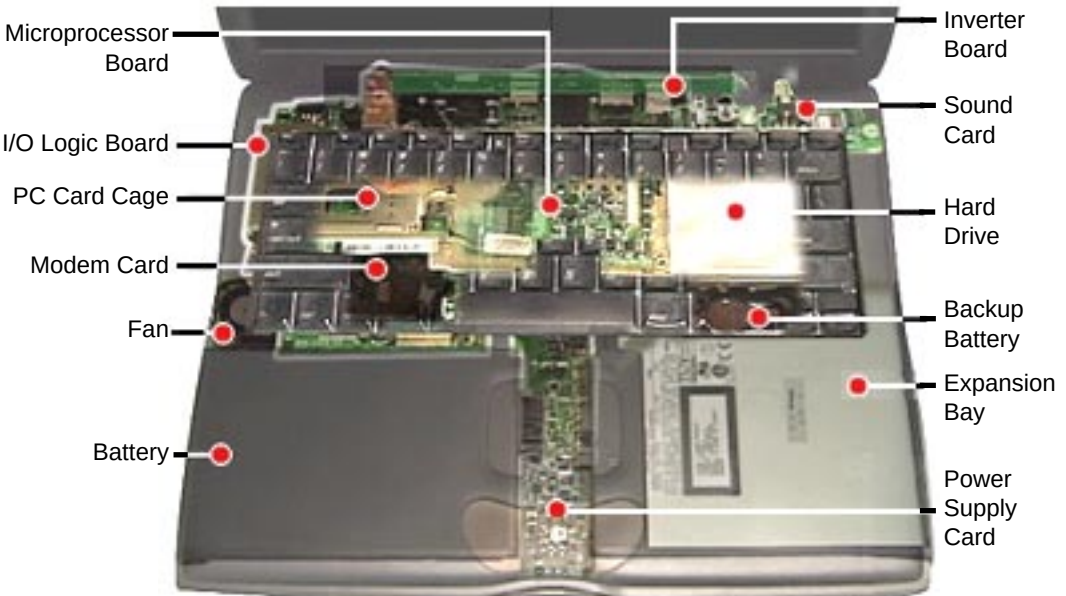


Microprocessor Board

The microprocessor board contains the high-speed components: G3 microprocessor backside cache memory, main memory slots, system ROM, memory controller, and PCI bus bridge IC.

The Microprocessor board has two memory card slots. The top slot is the user-replaceable slot. The slot on the underside of the board is used by the factory.

Internal Hardware Locator



Repair Issues

Prevent Cosmetic Damage

The outside plastics of the PowerBook G3 Series (Bronze Keyboard) are vulnerable to scratches and finger marks from skin oil. To prevent cosmetic damage to a customer's PowerBook, do not wear jewelry when handling the computer, and wear gloves if you have them available. Wipe fingerprints from the outside plastics with a damp cloth.

Caution: Do not use any substance containing isopropyl alcohol to clean the outside of the computer, or damage to the plastics will result.

Left Heatsink Screw Must Be Installed

Three Philips screws hold the heatsink in place over the microprocessor board. The screw on the left holds the heatsink firmly over the microprocessor on the microprocessor board. If the screw is not installed, the system could overheat.

Verify Parts Before Placing Orders

PowerBook G3 Series (Bronze Keyboard) computers offer configure-to-order features. For this reason, it is mandatory that you either see the part you are replacing, or use diagnostics to identify the part, before you place a parts order. Misidentification of parts may occur if this step is not performed first.

Exchange Parts Like for Like

Unless directed otherwise in the Service Parts Database, exchange parts like for like.

Three ways to identify I/O logic boards:

- Remove the microprocessor board and look for components at locations U8 and G2 on the top side of the I/O logic board. Boards with DVD have components at these locations, while boards without DVD do not.
- Check for a Ziva chip on the underside of the board. Boards with DVD have the chip, while board without DVD do not.
- Look for the ID code in the last five digits of the serial number on the board. Boards with DVD may have the ID code 601, and non-DVD boards may have 801. Some boards exist without these ID codes.

Repair Strategy

Beginning July 26, 1999, parts for the PowerBook G3 Series (Bronze Keyboard) will be available for order through the Service Price Pages and the AppleOrder and ARIS systems. Except for the displays, Apple Authorized Service Providers in the US can now repair PowerBook G3 Series (Bronze Keyboard) systems. In Canada, Apple Authorized Service Providers can also repair displays.

Service PowerBook G3 Series (Bronze Keyboard) computers through module exchange and parts replacement. Customers can request on-site service from Apple Canada Technical Answerline (Canada only). They can also choose carry-in service from an AASP.

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Ordering

Apple Service Providers planning to support the computer systems covered in this manual may purchase Service modules and parts to develop servicing capability. To order parts, use the AppleOrder (US only) or ARIS (Canada only) system and refer to the PowerBook G3 Series (Bronze Keyboard) Service Price Pages.

Large businesses, universities, and K-12 accounts must provide a purchase order on all transactions, including orders placed through the AppleOrder (US only) or ARIS (Canada only) system.

US Ordering

US Service providers not enrolled in AppleOrder may fax their orders to Service Provider Support (512-908-8125) or mail them to:

Apple Computer, Inc.
Service Provider Support
MS 212-SPS
2323 Ridgepoint Drive
Austin, TX 78754

For US inquiries, please call Service Provider Support at 800-919-2775 and select option #1.

Canadian Ordering

In Canada, all service parts (including the displays) are available through ARIS. Refer to the Service Price Pages or Service Source Online for part numbers and pricing.

Canadian Service Providers not enrolled in ARIS may fax their orders to Service Provider Support in Canada (800-903-5284). For Canadian inquiries, please call Service Provider Support at 800-217-9517 and select option #3.

Warranty/AppleCare/ARIS

US Only

PowerBook G3 Series (Bronze Keyboard) computers are covered under the Apple One-Year Limited Warranty. The AppleCare Protection Plan is also available for these products. Service Providers are reimbursed for warranty and AppleCare Protection Plan repairs. For pricing information, refer to Service Price Pages.

Canada Only

PowerBook G3 Series (Bronze Keyboard) computers are covered under the Apple One-Year Limited Warranty. The AppleCare Protection Plan is also available for these products. Service Providers are reimbursed for warranty

Specifications

PowerBook G3 Series (Bronze Keyboard)

Introduction

Specifications information for this product can be found in the SpecDatabase, which you can access at Service Source Online (http://service.info.apple.com) or on Service Source CD.

Spec Database at Service Source Online

From the Service Source Online home page, click Troubleshoot and Repair to access the main repair procedures page. Then click either Apple Spec in the navigation table in the upper right corner of the page, or click Apple Spec Database from the list of reference tools below.

Spec Database on Service Source CD

Open the CD and double-click the Apple Spec Database alias located at the top level of the CD.

Troubleshooting

PowerBook G3 Series (Bronze Keyboard)

General

In each product manual on Service Source, you will find Flowcharts and/or Symptom Charts designed to help you diagnose and repair Apple computers.

If you have narrowed the problem down to a particular symptom, start with the Symptom Charts. Because cures are listed in the order of most likely solution, try the first cure first. Verify whether or not the product continues to exhibit the symptom. If the symptom persists, try the next cure.

If you are not sure what the problem is, or if the Symptom Charts do not resolve the problem, refer to the Flowcharts.

If you require additional assistance, contact Apple Technical Support.

Power-On Self Test

There is a power-on self test that resides in the ROM of the PowerBook G3 Series (Bronze Keyboard). This test automatically runs whenever the computer is powered on after being fully shut down (the power-on self test does not run if the computer is only restarted).

If a problem is detected during the test, you will not hear a normal startup chime. Instead, the system will beep as explained below.

On the next page is a definition of what the error beeps at startup time signify.

Power-On Self Test Beep Definitions

Beeps	Definition
1 beep	No RAM is installed or detected.
2 beeps	EDO memory is installed. The PowerBook G3 Series (Bronze Keyboard) ships with SDRAM SO-DIMMs and does not accept EDO memory.
3 beeps	No RAM banks passed memory testing.
4 or 5 beeps	Bad checksum for the remainder of the boot ROM. The ROM (which is located on the microprocessor module) is bad.

Symptom Charts

Startup

RAM failure occurs (breaking glass sound after startup chord)

Note: There is no RAM on the microprocessor board itself, so this tone will occur if no memory is installed in at least one of the slots.

1 Remove top RAM SO DIMM (if present) and restart computer. If startup sequence is normal, replace RAM SO DIMM and retest.
2 Replace bottom RAM SO DIMM and retest.
3 Replace microprocessor board.
4 Replace I/O logic board.

Hardware failure occurs (breaking glass sound after startup chord)	1 Turn off the computer and disconnect any external devices. 2 Reset PRAM (during startup, hold Command-Option-P-R keys until the second startup tone is heard). 3 Remove expansion module from right expansion bay and restart computer. If startup sequence is normal, insert expansion module and retest. 4 Disconnect hard drive cable from the I/O logic board and restart computer. If startup sequence is normal, reconnect cable and retest. 5 Replace hard drive cable (pull up evenly on the cable to avoid bending pins). 6 Replace hard drive. 7 Replace microprocessor board. 8 Replace I/O logic board.

Power

Computer won't power up	1 Restart computer by pressing the reset button on the back of the unit. Wait five seconds and press the power on key. 2 Try known-good power adapter. 3 Try known-good, firmly seated, charged battery. Repeat once. 4 Connect power adapter and restart computer in 3–4 minutes. 5 Disconnect internal keyboard completely and try powering up unit. If unit powers up, replace keyboard. 6 Verify that microprocessor card is seated firmly in connector. 7 Replace sound card. 8 Replace power supply card. 9 Replace microprocessor board. 10 Replace I/O logic board.

Screen is blank; backlight isn't on; computer doesn't respond	1 Restart computer by pressing the reset button on the back of the unit. Wait five seconds and press the power on key. 2 Restart computer. 3 Disconnect power adapter, remove battery, and restart computer in 3-4 minutes. 4 Check power adapter cable. 5 Try known–good, charged battery. 6 Try known-good power adapter. 7 Remove all power (power adapter and batteries) and disconnect backup battery for ten minutes. 8 Check all I/O logic board cables and connections. 9 Replace sound card. 10 Replace microprocessor board. 11 Replace power supply card. 12 Replace I/O logic board.

After you remove battery and power adapter, some control panel settings are different	1 Connect power adapter to unit for 24 hours to see if backup battery is just depleted. (It takes approximately 48 hours to fully charge the backup battery.) 2 Check backup battery cable and connections. 3 Replace backup battery. 4 Replace I/O logic board.
Power adapter is plugged in, but Control Strip doesn't indicate adapter is connected	1 Verify that power adapter is connected correctly and the power cord is plugged solidly in the adapter. 2 Verify that there is power at the outlet. 3 Try known-good power adapter. 4 Try known-good power cord. 5 Reset power manager (press the reset button behind the I/O door. 6 Replace sound card. 7 Replace I/O logic board.

Computer runs when plugged into wall outlet but not on battery power	1 Turn off the computer, then restart by pressing the reset button on the back of the unit. Wait five seconds and press the power on key. 2 Reseat battery to make sure battery is mating with contacts on I/O logic board. 3 Try battery in opposite expansion bay. 4 Try known-good, firmly seated, charged battery. Repeat once. **Note:** LED should light up if battery is functioning. 5 Try known-good power adapter. 6 Replace power supply card. 7 Replace I/O logic board.

Battery won't charge	1 Turn off the computer, then restart by pressing the reset button on the back of the unit. Wait five seconds and press the power on key. 2 Try battery in opposite expansion bay. 3 Insert battery, leave in 15 seconds, then eject it. Repeat 4–5 times. 4 Try known-good battery. Repeat once. **Note:** LED should light up if battery is functioning. 5 Replace power supply card. 6 Replace I/O logic board.
Battery will not charge unless unit is in sleep mode or shut down	Verify that the appropriate power adapter is being used.

Video

Note: A certain number of defects are inherent in display technology and vary by many factors, including type of technology. If you suspect that your display contains an abnormal number of defects, call Apple Technical Support.

Caution: Do not use a metal screwdriver to reseat the display cables, or shorting could result. Use a plastic or nylon tool.

Partial or full row of pixels is always on or never comes on in an active matrix display	1 Check display cable and connections. 2 Replace display cable (international only). 3 Replace display (international only). 4 Replace I/O logic board. (In the US, call Technical Support before replacing the I/O logic board.)

Display is very light or totally white	1 Verify display cable and inverter board cable connections to the I/O logic board. 2 Replace inverter board. 3 Replace display cable (international only). 4 Replace display (international only).
No display, but computer appears to operate correctly	1 Connect power adapter. 2 Adjust screen brightness setting. 3 Verify display cable, inverter board, and I/O logic board connections. 4 Connect external, known-good monitor. 5 Verify inverter cable is properly connected. 6 Replace inverter cable. 7 Replace inverter board. 8 Replace display cable (international only). 9 Replace display (international only). 10 Replace I/O logic board.

An external monitor connected to the PowerBook shows no video	1 Verify external monitor has power. 2 Try different resolutions in the Monitors and Sound control panel. 3 Try another display cable and/or proper video adapter. 4 Try another monitor. 5 Restart unit and reset PRAM. 6 Replace I/O logic board.
An external monitor connected to the PowerBook shows either horizontal or vertical rolling, or horizontal or vertical distortion	1 Try different resolutions in the Monitors and Sound control panel. 2 Verify monitor using another computer. 3 Try another video adapter if using one with the monitor. 4 Replace I/O logic board.

Backlight doesn't operate; screen is very dim	1 Adjust screen brightness setting. 2 Verify that backlight cable connection is secure. 3 Check display cable and inverter board connections to the I/O logic board. 4 Verify that inverter cable is properly connected and that cable is good. 5 Verify that cables are not pinched or severed. 6 Replace inverter board. 7 Replace display (international only). 8 Replace I/O logic board.

Sound

No sound from speaker(s)	1 Verify that mute mode is not enabled (F6 on the keyboard). 2 Check the volume setting by pressing F4 on the keyboard without hitting the function key first. 3 Verify no external speakers or headphones are plugged in. 4 Reset PRAM. 5 Make sure speaker cable is plugged into sound card. 6 Replace sound card. 7 Replace speaker(s). 8 Replace I/O logic board.
Startup sound is heard, then no sound from speaker(s)	1 Remove sound preferences from System Folder, reset PRAM, then restart. 2 Perform clean install of system software.

Hard Drive

Internal hard drive does not spin	1 Make sure power adapter is connected. 2 Disconnect external SCSI or USB devices. 3 Check hard drive connection. 4 Replace hard drive cable. **Note:** Pull up evenly on the cable to avoid bending pins. 5 Replace hard drive. 6 Replace I/O logic board.

CD-ROM Drive/DVD-ROM Drive

Drive does not accept disc	1	Verify disc is properly seated in the carrier.
	2	Replace disc (if dirty or damaged).
	3	Reinsert drive in expansion bay.
	4	Replace drive.
	5	Replace I/O logic board.
Volume control does not operate correctly	1	Check Monitors and Sound control panel setting.
	2	Verify that mute mode is not enabled.
	3	Verify the setting of volume control button.
	4	Reinsert drive.
Macintosh cannot mount drive	1	Reinsert drive.
	2	Verify that Apple CD/DVD ROM extension is installed.
	3	Replace drive.
	4	Replace I/O logic board.

Expansion bay module will not insert properly in the expansion bay	1	Check for obstructions in the expansion bay.
	2	Check that the far right keyboard tab is inserted properly and not extending into the expansion bay.
	3	Try another module.
	4	Replace I/O logic board.
Drive makes grinding sound	1	Check the top of the drive module for scratches.
	2	Check the keyboard to see if the far right tab is correctly inserted in its slot. If the tab is under the palmrest and extending into the drive bay, it will interfere with the drive. Install the keyboard correctly.
	3	Try another module.
	4	Replace drive.

PC Card Module (PCMCIA)

PC Card won't eject

1. Make sure computer is not in sleep mode.
2. Make sure PC Card slot is not blocked.
3. Drag PC Card to trash.
4. Try PC Card eject button. (Press the PC Card eject button once to release the button, then again to eject the card.)
5. Remove keyboard and heat sink, then gently push the card out with your finger.
6. Verify that PC Card is not warped or damaged in any way; if so, replace with new card.
7. Replace PCMCIA cardcage.

PC Card is inserted but doesn't appear on desktop

Note: Modem and communication cards may not appear on desktop.

1 Verify that correct software for the PC Card is installed.
2 Manually eject the PC Card and reinsert it.
3 Try another PC Card.
4 Replace PCMCIA cardcage.
5 Replace I/O logic board.

Note: If "defective card" or "unrecognizable card" appears in place of card name in PCMCIA Eject control panel, card is damaged or computer does not have software required to support it. Eject card.

PC Card can't be inserted

1. Make sure PC Card is right side up (cards are keyed and cannot be inserted upside down).
2. Check for obstructions in the PC Card slot.
3. Push PC Card in from center of the exposed edge, not off center.
4. Try a different PC Card.
5. Replace PCMCIA cardcage.

DVD-Video

Movie plays, but special features (such as director's notes, other languages, etc.) unavailable	1 Not all DVD titles offer special features. Check the liner notes included with the disc for a list of features available. 2 If both the picture and sound are okay, then DVD drive is functional. This means either the software or the movie title (DVD video disc) is the source of the symptom. Try playing another title to determine if the disc is the cause. If the software is the cause, reinstall software.
DVD video disc will not play	1 Verify that the expansion module is a DVD drive. 2 Verify the disc is a DVD video disc. 3 Verify the computer has DVD support by looking at the label on the bottom of the unit or by running Apple System Profiler. 4 Clean the disc with an appropriate cleaner. 5 Try another disc. 6 Ensure DVD video disc appears on desktop.

	7 Check that Parental Controls setting is set to On. Select an MPAA rating at the same level or higher than the title being viewed. 8 Reinstall software. Use Extensions Manager to ensure that DVD extensions are enabled (select All On). 9 Check region code for DVD video title. (Warning message appears.)
Poor performance of DVD video disc (poor sound or picture)	1 Check the DVD video disc for scratches. 2 Ensure Virtual Memory is set to Off. 3 Check that Energy Saver control panel does not have advanced settings for Reduced Processor Speed selected. 4 Use Extensions Manager to disable extensions except for the standard Apple extensions and DVD extensions. Restart the PowerBook. 5 For an audio problem, try playing an audio CD. If problem persists, refer to the Sound symptom chart in this chapter.

Infrared Communication

Infrared communication is not working	1 Clean infrared window with soft lint-free cloth. 2 Make sure units are spaced greater than 3 feet but less than 6 feet and at less than a 20 degree angle. 3 Verify infrared signal is being received by host computer. 4 Replace I/O logic board.

Modem

No dial tone	1 Verify known-good analog (not digital) telephone line. 2 Verify cable is not plugged into Ethernet port. 3 If using Apple Remote Access 3.0, select Ignore Dial Tone in the Modem control panel. If the modem connects with this setting selected, try another phone line. If using a terminal or communications program, enter atx1 to disable tone detection. To reset the modem back to the factory settings, enter atz. 4 Replace cable/phone jack. 5 Replace modem EMI filter card. 6 Replace modem.
No internal modem selection available	1 Remove keyboard and verify modem is properly installed and modem EMI filter card is plugged in. 2 Verify correct modem software is installed and selected. 3 Replace modem.

USB and SCSI Peripherals

After you connect external USB device, computer does not boot	1 Disconnect all external devices and boot computer. Then plug in USB peripherals. 2 Eliminate chain by plugging in only one peripheral. 3 Try the other USB port. 4 If USB device is self-powered, switch on external USB device before starting computer. 5 Check cable connections. 6 Try known-good USB cable. 7 Try known-good external USB device. 8 Replace I/O logic board.
Computer boots to flashing SCSI icon (similar to SCSI Disk Mode)	1 Verify the cable is Apple SCSI Cable (29 pins), not Disk Mode Cable (30 pins). 2 Try known-good SCSI system cable. 3 Reset PRAM. 4 Replace I/O logic board.

After you connect external SCSI device, computer does not boot or device does not show up	1 Verify that device and SCSI chain are terminated correctly. 2 Switch on external SCSI device before starting computer. 3 Check cable connections. 4 Try known-good Apple SCSI cable. 5 Verify that the SCSI ID select switch setting on external device is unique. 6 Try known-good external SCSI device. 7 Try known-good external SCSI device without terminator. 8 Replace I/O logic board.
In SCSI disk mode, computer does not display SCSI icon until host is booted, or computer crashes when host is shut down	1 Check that there is a valid System Folder on the PowerBook's internal hard drive. 2 Make sure password security is off. 3 Verify that computer has a unique SCSI ID in PowerBook SCSI Setup control panel. 4 Try Apple-brand SCSI disk mode cable with 30 pins. 5 Verify SCSI disk mode cable is good and check the connection. 6 Replace I/O logic board.

USB device such as digital camera not recognized by computer	**Note:** If you are trying to use a serial device with a USB/Serial adapter, check with the manufacturer for compatibility. 1 Verify current driver for the device is installed. 2 Turn on camera after initiating download with camera application. 3 Try different USB device on same port. 4 Eliminate chain by plugging in only one peripheral. 5 Try the other USB port. 6 Replace I/O logic board.
I/O devices are unrecognized, or garbage is transmitted or received	1 Check cables. 2 Check with vendor for current drivers. 3 Try other USB port if device is USB. 4 Reset PRAM. 5 Test device with known-good computer. 6 Replace I/O logic board.

Cursor does not move when you are using trackpad	1 Shut down computer, unplug power adapter, and remove battery. Let computer sit for one minute before restarting. 2 Reset power manager (press the reset button behind the I/O door. 3 Check trackpad connections. 4 Connect USB mouse and try to move cursor. If trackpad does not move cursor but external USB mouse does, replace trackpad (included in top case). 5 Replace I/O logic board.
Cursor moves on screen with external mouse connected, but clicking or double-clicking the mouse has no effect	1 If the mouse is connected to an external keyboard, connect the mouse to one of the USB ports on the computer. 2 Try the other USB port. 3 Try another mouse. 4 Reset PRAM. 5 Boot off the CD that came with the computer. If the mouse works, reinstall the system software. 6 Replace I/O logic board.

Cursor moves, but clicking trackpad button has no effect	1	Reset power manager (press the reset button behind the I/O door.
	2	Remove top case and manually press trackpad button on power supply with a nylon tool or other non-metal object. If button activates cursor, check top case seating.
	3	Replace power supply card.
	4	Replace trackpad button actuator (included in the top case).
Cursor does not move on the screen with an external mouse, but USB external keyboard works	1	Verify that the mouse is connected securely to the USB keyboard or port.
	2	Check inside mouse for buildup of dirt or other contaminants. Clean mouse if necessary.
	3	If mouse is connected to the keyboard, connect it to a USB port.
	4	Try the other USB port.
	5	Try another mouse.
	6	Replace I/O logic board.

Cursor intermittently does not move or moves erratically

Note: User must touch trackpad with the surface of only one finger at a time and point directly down on the trackpad surface.

1 Clean trackpad surface (with computer off, using a non-static-inducing material).
2 Reset power manager (press the reset button behind the I/O door.
3 Try unit on battery power. If problem goes away, replace power adapter.
4 Check trackpad connections.
5 Replace trackpad (included in top case).
6 Replace trackpad cable.
7 Replace I/O logic board.

No response to any key on keyboard	1	Verify that computer is on.
	2	Reset the power manager (press the reset button behind the I/O door.
	3	Check keyboard connection by disconnecting and reconnecting keyboard cables.
	4	Replace keyboard.
	5	Replace I/O logic board.
Known-good Ethernet network printer does not print	1	Verify that Chooser and control panel settings are correct.
	2	Reinstall printer drivers.
	3	Check cables.
	4	Attach computer directly to printer using Ethernet crossover cable, and retest.
	5	Reset PRAM.
	6	Replace I/O logic board.

Known-good USB printer does not print	1 Verify that computer has correct driver installed. Check vendor's Web site to download current driver. 2 Reset PRAM. 3 Verify that Chooser and control panel settings are correct. 4 Run Apple System Profiler to see if it recognizes that a USB printer is connected. If it does, it is a software issue. 5 Try the other port. Make sure the printer is connected directly to the computer. 6 Check cables. 7 Replace I/O logic board.
USB device experiences a partial lack of power	1 Plug the device into an electrical outlet if it has a power cord. 2 Unplug the device and plug it into another USB port on the computer or another device plugged into a power outlet such as a USB hub.

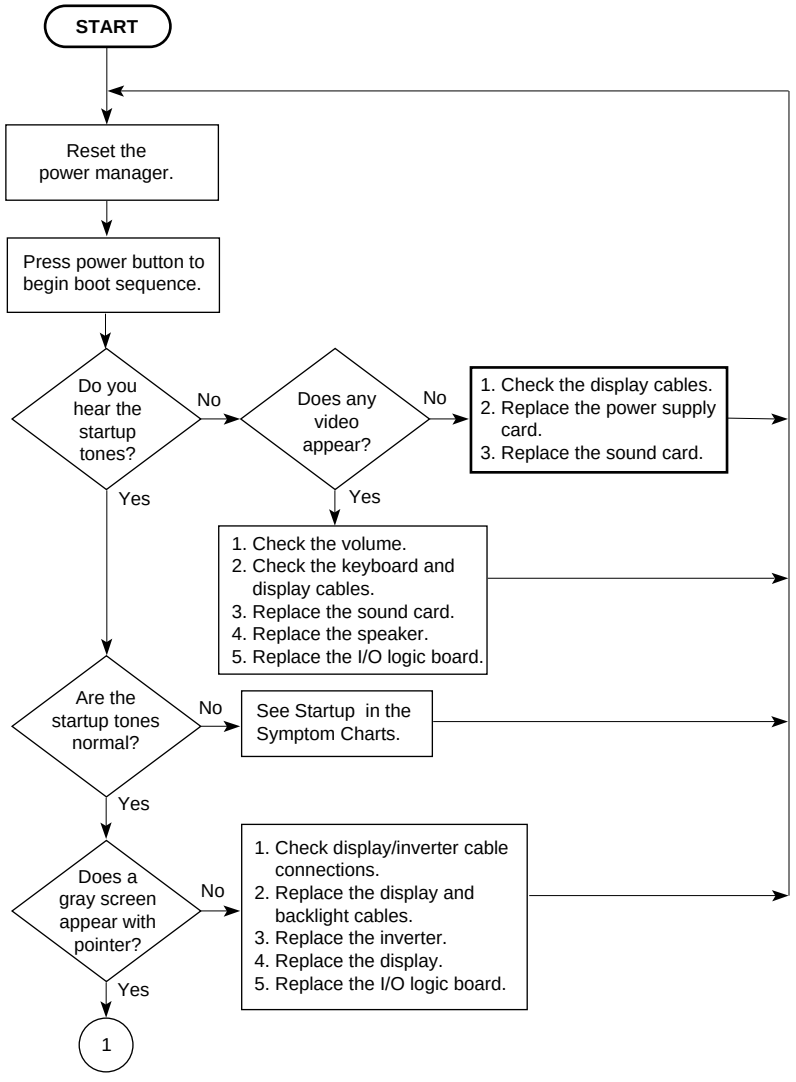
Not enough power for the USB device to function at all	1 Plug the device into an electrical outlet if it has a power cord. 2 Unplug the device and plug it into another USB port on the computer or another device plugged into a power outlet such as a USB hub.
After sleep, a USB peripheral is sometimes not recognized	1 Restart the unit. 2 Contact peripheral manufacturer for latest driver update.

Miscellaneous

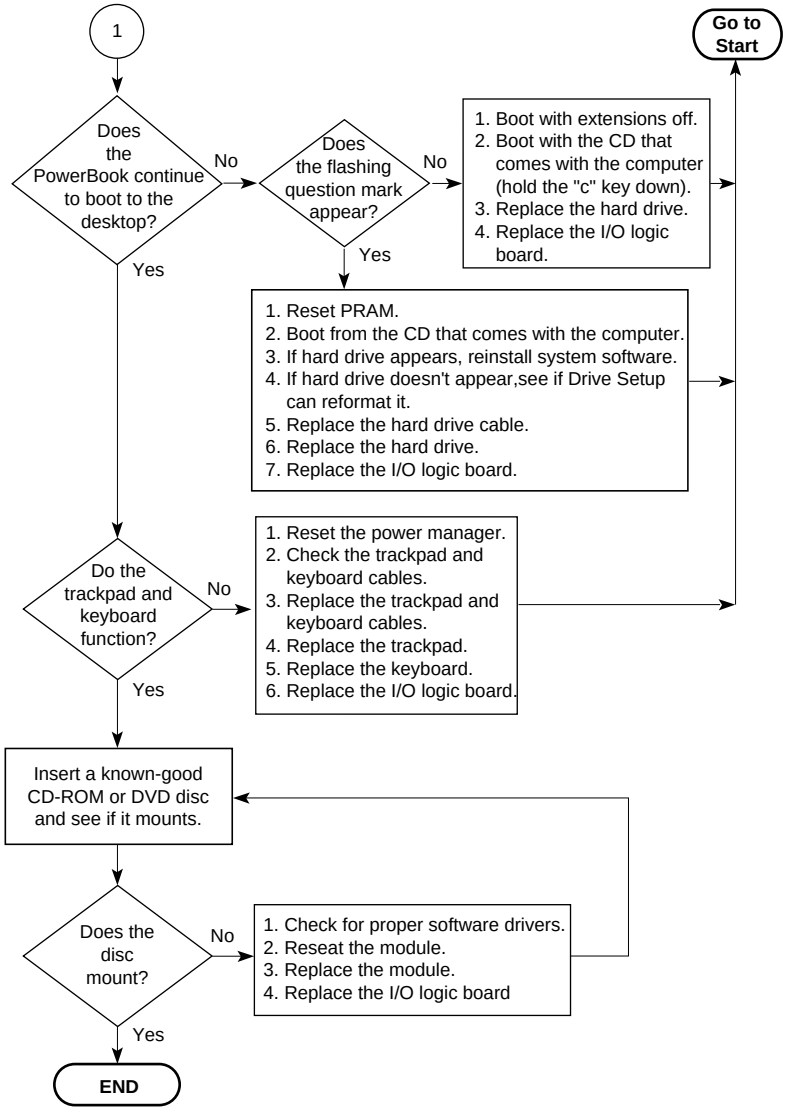
Sleep light won't come on	1 Verify that computer is in sleep mode and not off. 2 Reset power manager (press the reset button behind the I/O door. 3 Replace inverter board.
Screen goes blank and computer shuts down every few minutes	1 Computer is going into system sleep to conserve battery power. Adjust sleep delays in Energy Saver control panel or connect power adapter. 2 Verify that the appropriate power adapter is being used. 3 Try a known-good power adapter.
Application seems to run slower after a few seconds	Computer is either in processor cycling mode or in reduced processor speed mode. If this interferes with operation of application, turn off Allow Processor Cycling and Reduce Processor Speed in the Energy Saver control panel. **Note:** These features conserve energy when running off battery power.

Hard drive is slow to respond, or screen goes blank too often	Adjust sleep delays in Energy Saver control panel or connect power adapter.
Intermittent operating problems such as no booting or initialization errors	1 Check that all three screws are in the heat sink. 2 Verify that microprocessor board is properly installed. 3 Press on microprocessor board a second time to make sure the board is fully seated. **Caution:** The microprocessor board can be partially inserted and the computer will still function. However, over time, heat will cause a partially seated microprocessor board to lose contact and cause intermittent system problems. The connection of these boards is checked and double-checked at the factory.
FAX software is not working	The PowerBook G3 Series (Bronze Keyboard) comes with FAXSTF software installed. Apple does not provide support for this software. Contact STF Technology at 660-463-2021 or at stfsupport@stfinc.com.

PowerBook G3 Series Troubleshooting Flowchart—Startup Problems



PowerBook G3 Series Troubleshooting Flowchart—Startup Problems (continued)


1
Go to Start
Does the PowerBook continue to boot to the desktop?
No
Yes
Does the flashing question mark appear?
No
Yes
1. Boot with extensions off.
2. Boot with the CD that comes with the computer (hold the "c" key down).
3. Replace the hard drive.
4. Replace the I/O logic board.
1. Reset PRAM.
2. Boot from the CD that comes with the computer.
3. If hard drive appears, reinstall system software.
4. If hard drive doesn't appear,see if Drive Setup can reformat it.
5. Replace the hard drive cable.
6. Replace the hard drive.
7. Replace the I/O logic board.
Do the trackpad and keyboard function?
No
Yes
1. Reset the power manager.
2. Check the trackpad and keyboard cables.
3. Replace the trackpad and keyboard cables.
4. Replace the trackpad.
5. Replace the keyboard.
6. Replace the I/O logic board.
Insert a known-good CD-ROM or DVD disc and see if it mounts.
Does the disc mount?
No
Yes
1. Check for proper software drivers.
2. Reseat the module.
3. Replace the module.
4. Replace the I/O logic board
END

Take Apart

PowerBook G3 Series (Bronze Keyboard)

Tools

Use the following tools for procedures in this chapter:

- 5 mm nut driver
- #8 Torx screwdriver (T-8)
- #1 Phillips screwdriver (for the heatsink and modem)
- Flat-head screwdriver
- Flat-blade nylon or plastic tool (spudger)
- Dental pick or hook tool (to open flex connectors)
- Torque screwdriver (highly recommended for some replacement procedures)
- Razor blade or Exacto knife (to remove screw covers)
- Needlenose pliers (for some cable connections)

Caution: If you use a magnetic Torx driver, do not use it around the hard drive or the sleep reed switch.

Cables

Follow these guidelines when working with cables:

- Ensure that all cables are routed exactly when reassembling. Use all grooves and/or protrusions to align cabling. If the cable is improperly routed, you may not be able to reassemble the computer, or once reassembled, the computer may fail to function.
- Check that all cables are properly aligned in the connectors and that the connections are tight.
- Handle flex cables carefully. Using excessive force to disconnect a cable can tear the cable or damage it so it will not work properly.
- Use a nylon tool or dental pick to help loosen cable connections.

Expansion Bay Modules

Before you begin, unplug the AC adapter.

Caution: You must remove all modules (batteries and drives) in the expansion bays before performing any Take Apart procedure.

1 Open the display to a 90-degree angle to prevent the computer from tipping over when the expansion bay modules are removed.

Note: If you open the display all the way, support the underside of the screen with a book or other flat object.

2 Pull the expansion bay eject arm toward you to eject the module.

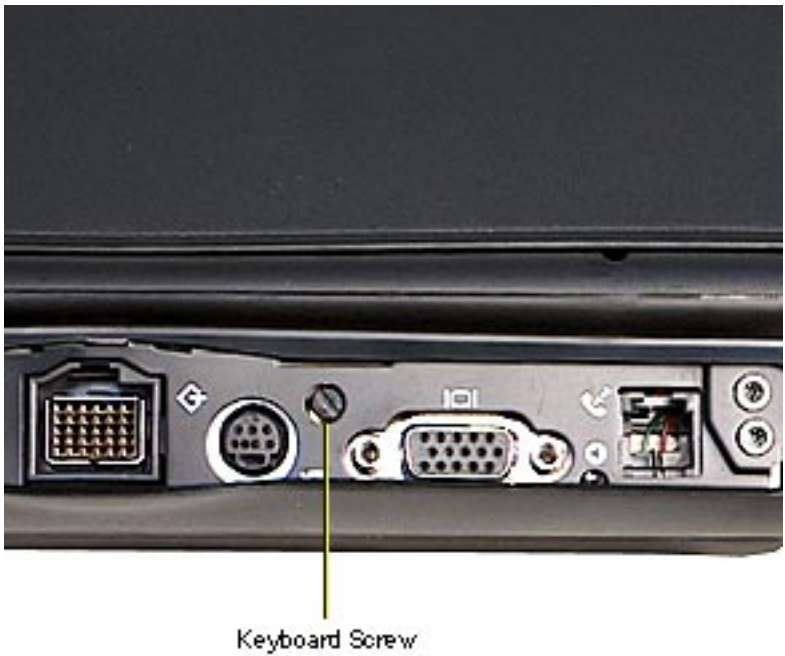
3 Slide the module out of the expansion bay.

Keyboard

Before you begin, remove the following:

- AC adapter
- Expansion bay modules
- Modem

Note: You do not need to disconnect and remove the keyboard completely to gain access to the modem, hard drive, SDRAM DIMMs, backup battery, and some other modules.



1 Unlock the keyboard if it is locked. Use a flathead screwdriver to turn the keyboard locking screw at the back of the computer counter-clockwise.

Note: The keyboard locking screw is captured and should not be completely removed.

2 Pull down on the keyboard release tabs located to the left of the F1 and F9 keys until the top portion of the keyboard pops up.

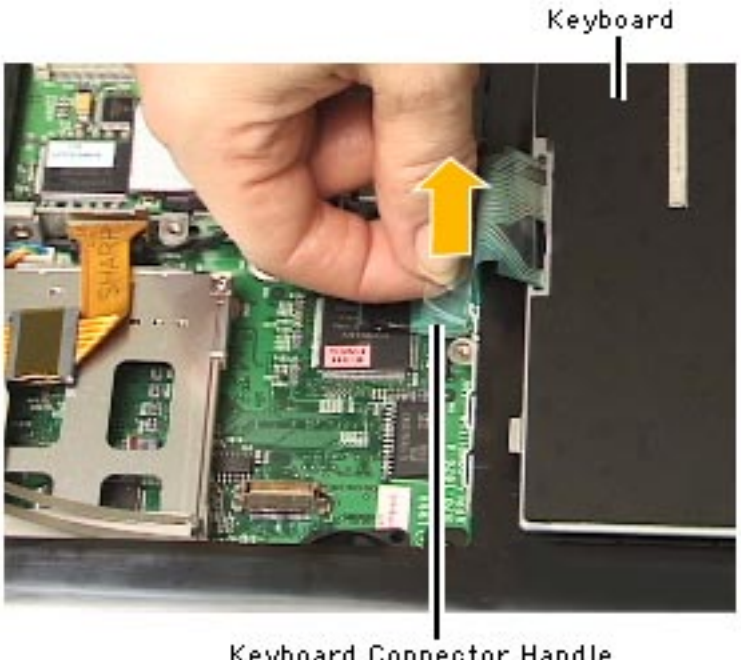
Caution: Do not lift the keyboard by the keycaps. Keycap replacement procedures can be found in the Additional Procedures chapter of this manual.

3 Lift the top of the keyboard up and pull it toward you to disengage the tabs holding the keyboard in place.

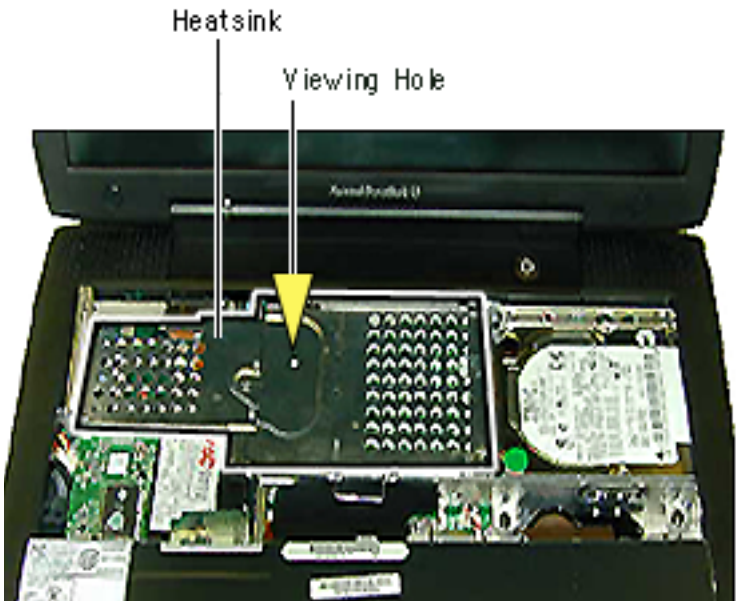
Replacement Note: Check that the far right tab on the keyboard is in the slot and not protruding into the expansion bay.

4 Flip the keyboard over and lay it on top of the palm rests and trackpad.

5 Remove the heatsink and modem by following the instructions in the “Heatsink” and “Modem” sections of this chapter if you are removing the keyboard.



6 Pull up on the keyboard connector handle to release the keyboard cable from its connector.



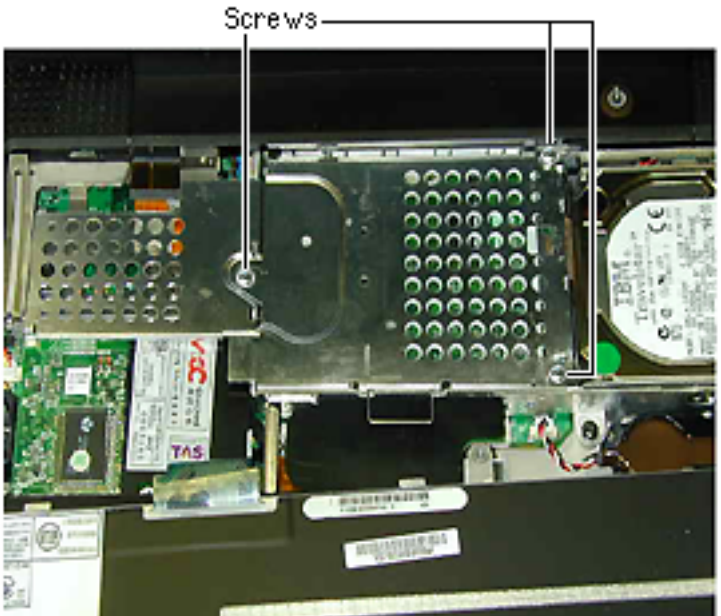
Heatsink

Before you begin, remove the following:

- AC adapter
- Expansion bay modules
- Keyboard

Look through the viewing hole in the center of the heatsink to verify that the top of the heat spreader is white.

If blue shows through the hole, remove the heatsink and peel the blue film off the heat spreader. This will



prevent the microprocessor from overheating.

Caution: The screw on the left side of the heatsink must be installed or the heatsink will not touch the microprocessor board. This will cause the unit to overheat.

1 Remove the three Phillips screws on the heatsink.

2 Pull up on the handle and pull the heatsink forward.

Replacement Notes: Slide the ferrite bead on the flex display cable toward the clutch when replacing the heatsink. Make sure the heatsink does not press down on the ferrite bead.

Align the five tabs on the rear of the heatsink to the corresponding slots below the clutch cover.

Tuck the hard drive tab under the heatsink before screwing the heatsink down.

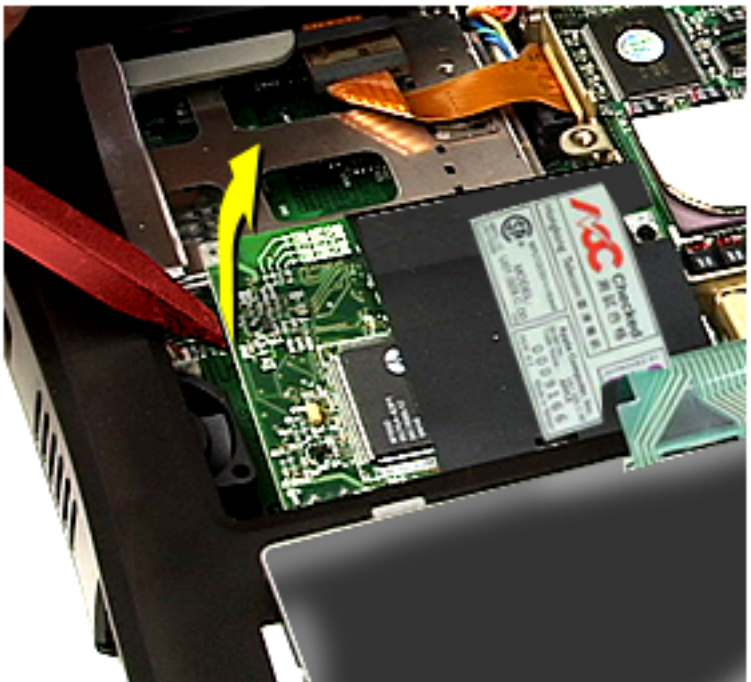
The heat spreader on top of the microprocessor may loosen and stick to the bottom of the heatsink. Make sure that the microprocessor has a heat spreader in place if you replace either the microprocessor board or heatsink.

Modem

Before you begin, remove the following:

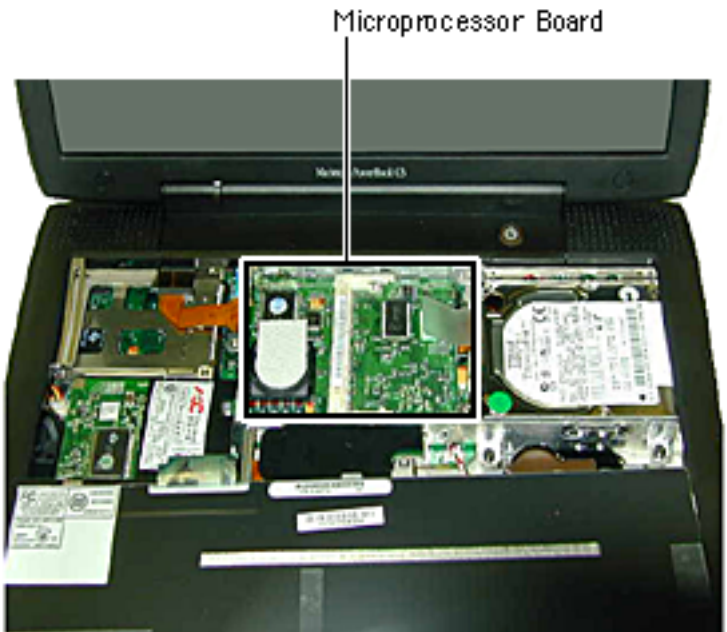
- AC adapter
- Expansion bay modules
- Keyboard
- Heatsink

1 Remove the two Phillips screws on the modem.



2 Use a flat-blade nylon tool to lift up the top, left side of the modem and release it from its connector.

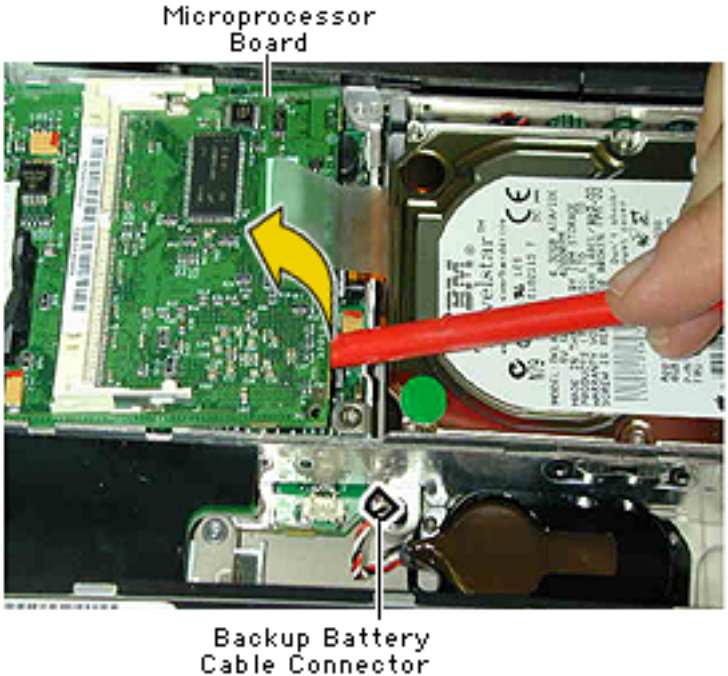
3 Disconnect the EMI filter card cable on the right side of the modem.



Microprocessor Board and SDRAM

Before you begin, remove the following:

- AC adapter
- Expansion bay modules
- Keyboard
- Heatsink



1 Disconnect the backup battery from the I/O logic board.

Note: For instructions on how to replace the backup battery, refer to the Additional Procedures chapter of this manual.

2 Lift up on the right side of the board with a nylon tool.

3 Pull the board to the right until the tabs on the left clear the slots in the stiffener.

Replacement Notes: Press twice on the microprocessor board to make sure it is firmly seated.

Make sure the hard drive tab is not caught under the microprocessor board when you replace the board.

Caution: The heat spreader on top of the microprocessor may loosen and stick to the bottom of the heatsink. Make sure that the microprocessor has a heat spreader in place if you replace either the microprocessor board or the heatsink.

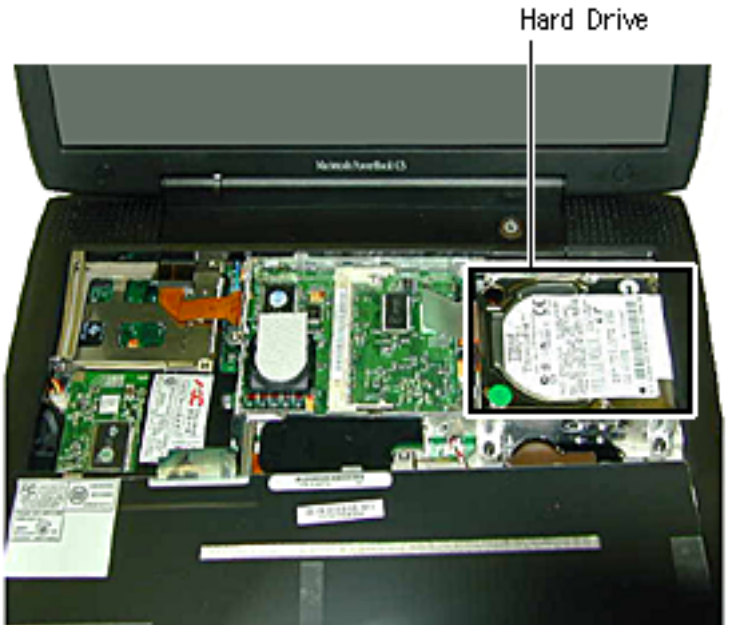
SDRAM

There are two expansion slots for RAM modules on the microprocessor board. The factory-installed RAM is on the underside of the microprocessor board.

1 Pull the plastic snaps on either side of the RAM card to the sides. The card will tilt up.

2 Pull the RAM card out.

Replacement Note: Hold the RAM card at a 30-degree angle and line up the notch in the RAM card with the small plastic tab in the RAM expansion slot. Push in on the card and then down until the two plastic snaps click into place.



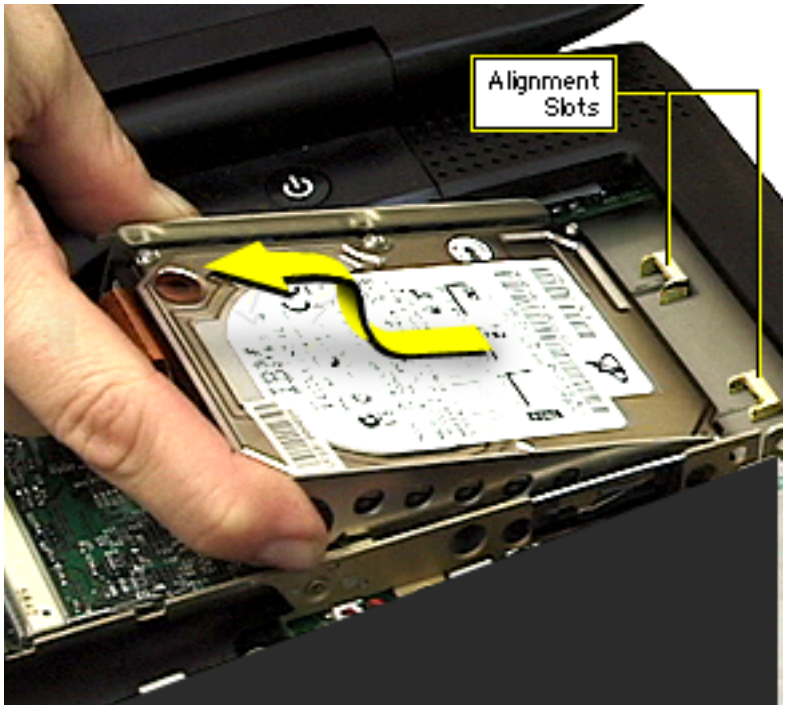
Hard Drive

Before you begin, remove the following:

- AC adapter
- Expansion bay modules
- Keyboard
- Heatsink

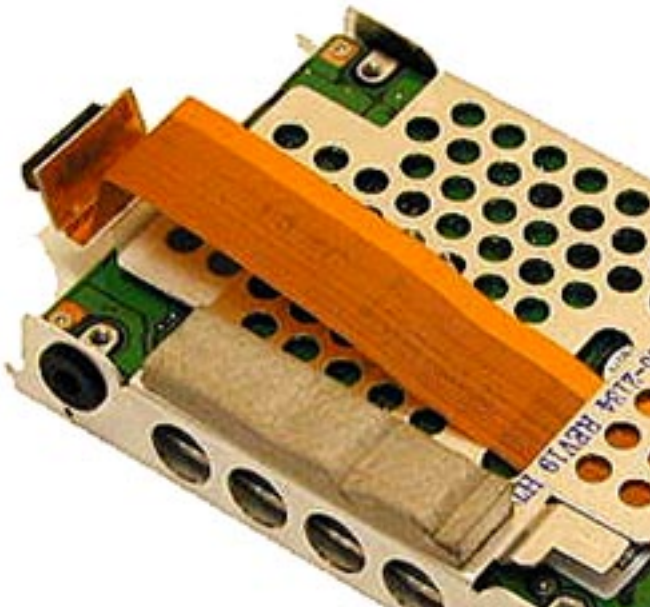
1 Fold the tab attached to the hard drive bracket to the right and use a nylon tool to disconnect the hard drive cable from the I/O logic board.

2 Pull up on the tab until the hard drive lifts up.



3 Grasp the hard drive by the edges of the hard drive carrier and pull it out to the left. Rock it back and forth if it fits snugly.

Replacement Note: Slide the hard drive in so that the tabs in the bottom of the bracket fit inside the alignment slots on the bottom case. Take care not to scrape the cable on the top of the stiffener.



4 Remove the four T-8 screws at each black grommet.

5 Pull the hard drive away from the bracket and pull the hard drive cable through the slot in the bracket.

6 Use a nylon tool to loosen the hard drive cable and release it from the hard drive connector.

Caution: Bent pins in the hard drive cable may affect the performance of the hard drive. To avoid bending pins,

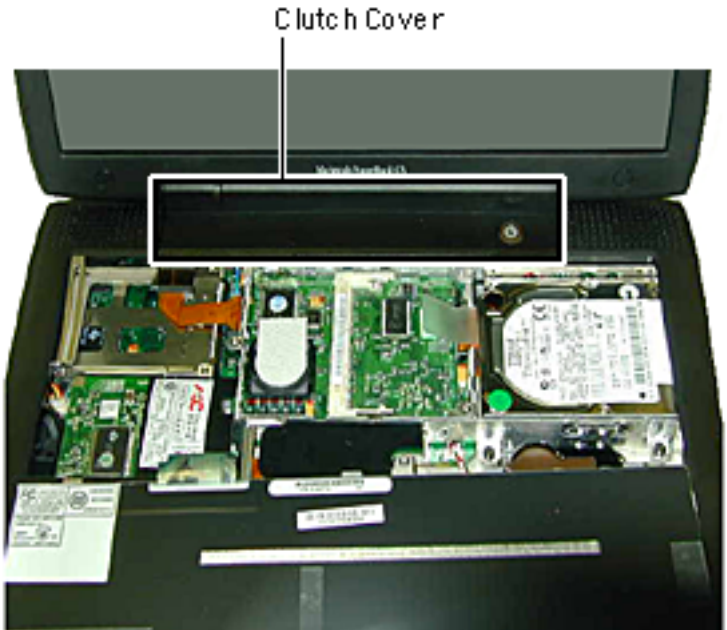
loosen both sides of the connector before pulling up on the hard drive cable.

Hard Drive Replacement

1 Place the hard drive in the hard drive bracket with the label showing through the open side.

2 Route the hard drive cable through the slot in the bracket on the component side of the hard drive before replacing the four screws.

Caution: The hard drive cable is not keyed. If you troubleshoot or format a hard drive outside the unit, make sure the cable is inserted into the connector on the I/O logic board correctly. Serious damage could result to both the hard drive and the computer if the cable is connected improperly.



Clutch Cover

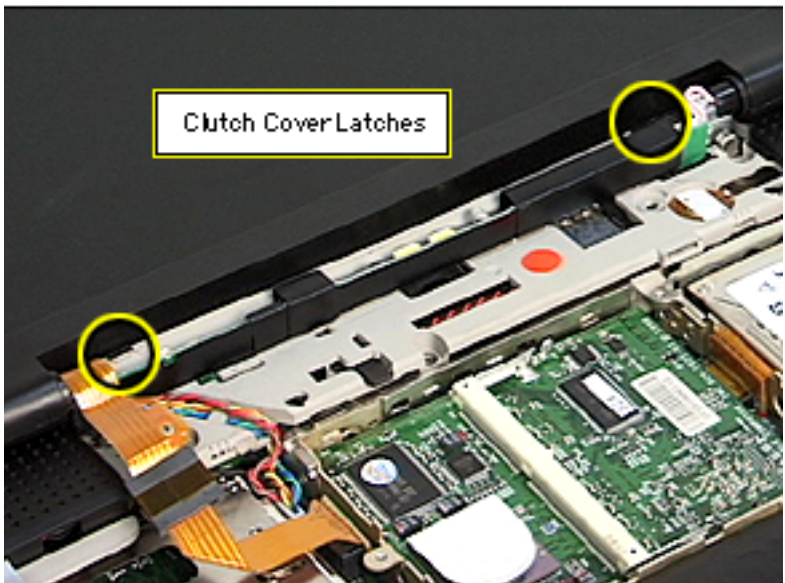
Before you begin, remove the following:

- AC adapter
- Expansion bay modules
- Keyboard
- Heatsink

1 Insert the flat end of a nylon tool into the curved seam on the right side of the clutch cover and pop the cover up. Take care not to damage the backlight cable under the right side of the clutch cover.

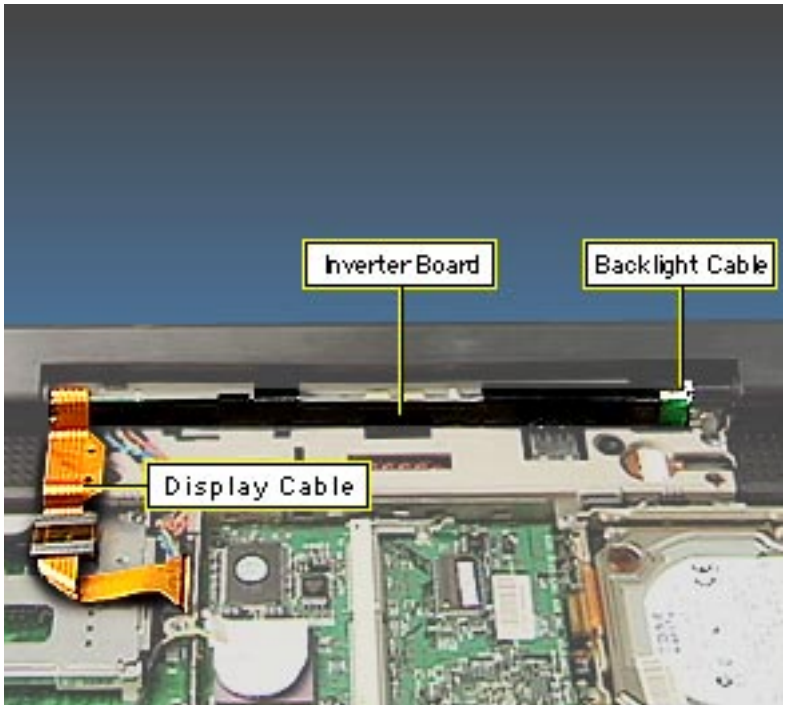
Caution: Do not insert a tool on the left side of the clutch or you could damage the flex display cable.

2 Pull the top edge of the clutch cover toward you to disengage the two hooks along the top edge.



Replacement Notes: Line up the display cable so that the holes in the cable fit over the pins in the top case and hold it in place with your left hand while you replace the clutch cover.

Line up the hooks on the top edge of the clutch cover to the corresponding latches, then press the bottom edge of the clutch cover down on both ends until it snaps into place.



Inverter Board

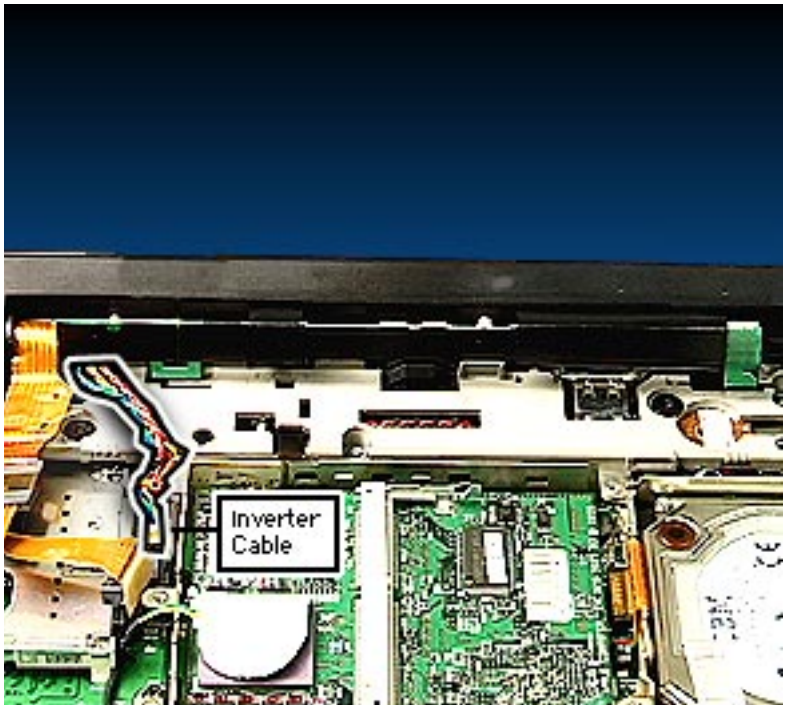
Before you begin, remove the following:

- A/C adapter
- Expansion bay modules
- Keyboard
- Clutch cover

Caution: Do not flex or bend the inverter board.

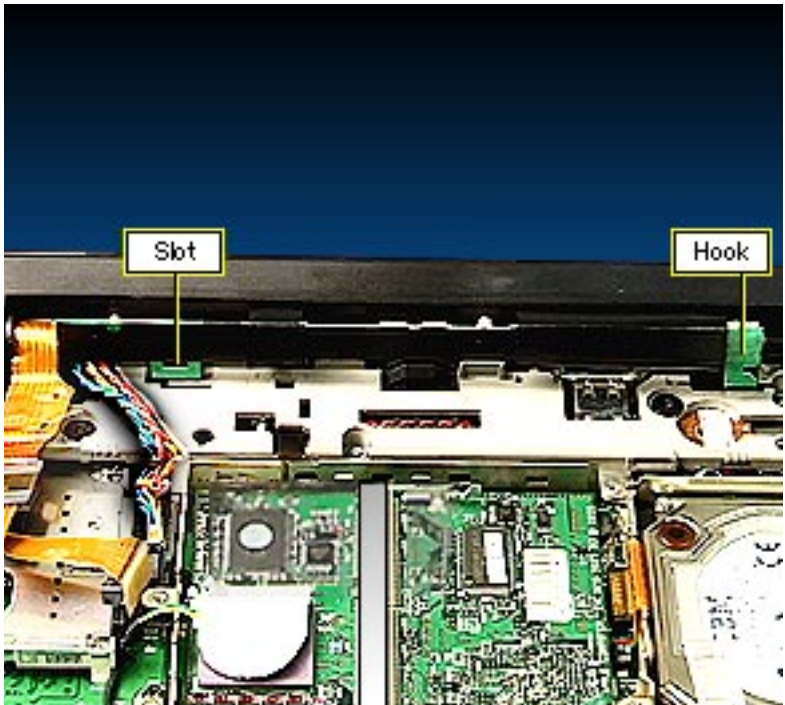
1 Disconnect the display cable and move it up and out of the way.

Caution: The connector on the display cable has exposed metal contacts. Use only a



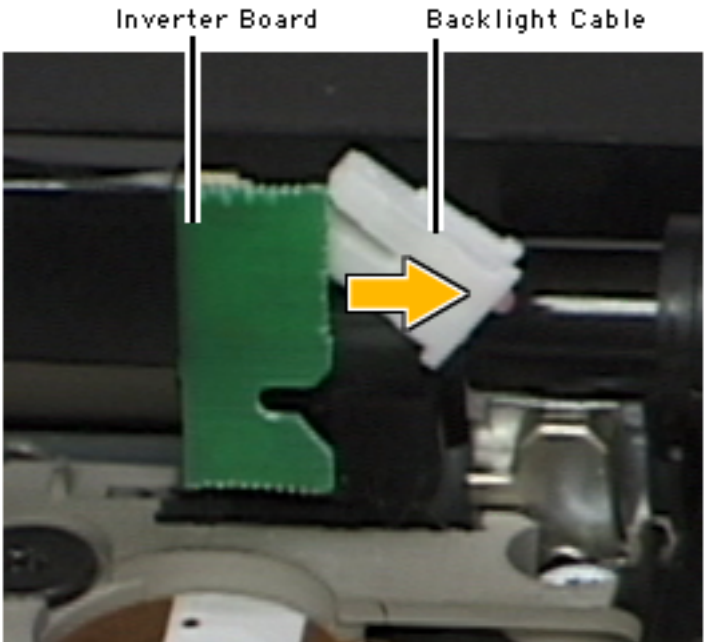
non-metal tool to connect and disconnect this cable or you could short out the system.

2 Disconnect the inverter cable at the I/O logic board and pull it out of its routing.



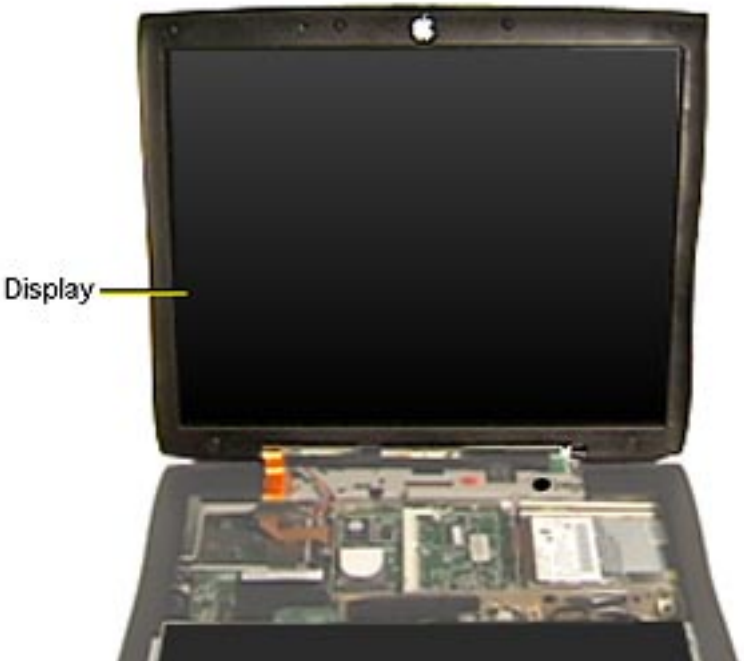
3 Tilt the inverter board slightly toward you to disengage the slot on the left end of the board from its holding tab.

4 Slide the inverter board straight to the left until the hook on the right end of the board clears its holding slot. Do not bend the board.



5 Disconnect the backlight cable on the right side of the inverter board.

Caution: Do not pull on the backlight cable or attempt to pull the cable further out from the display, or you may pinch the wire.



Display Module

Before you begin, remove the following:

- A/C adapter
- Expansion bay modules
- Keyboard
- Heatsink
- Clutch cover
- Inverter board

Screws

1 Make sure the display cable is disconnected.

2 Remove the four T-8 screws behind the I/O door.

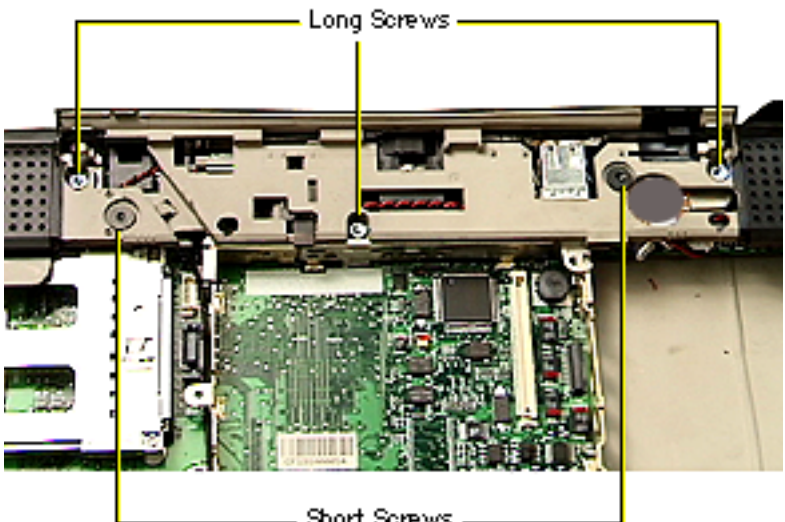
3 Lift up on the display to remove it from the base. Do not change the position of the clutches.

Caution: The four screws behind the I/O door are slightly longer than other similar screws and could cause dimpling of the plastics if they are used in the wrong location.

Top Case

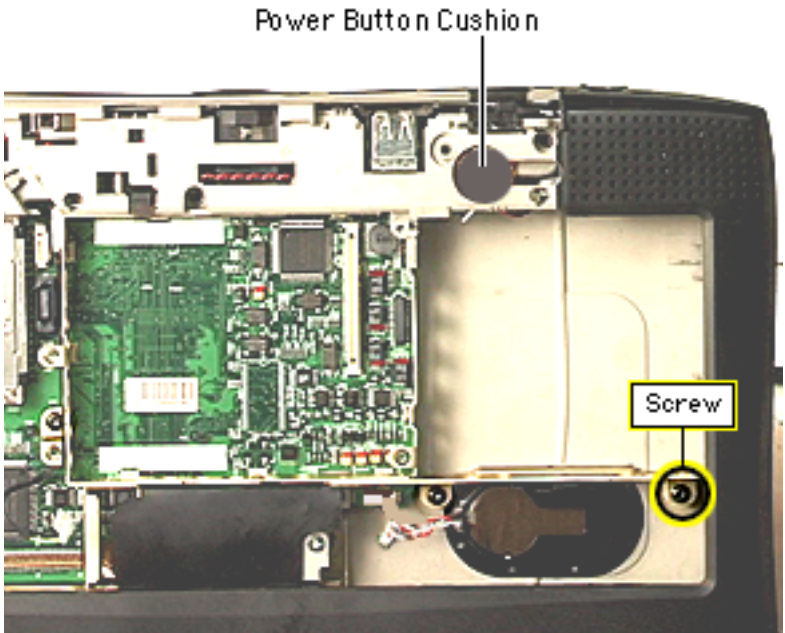
Before you begin, remove the following:

- A/C adapter
- Expansion bay modules
- Keyboard
- Modem
- Heatsink
- Hard drive
- Microprocessor board
- Clutch cover
- Inverter board
- Display module



1 Remove the three long, silver T-8 screws under the clutch cover.

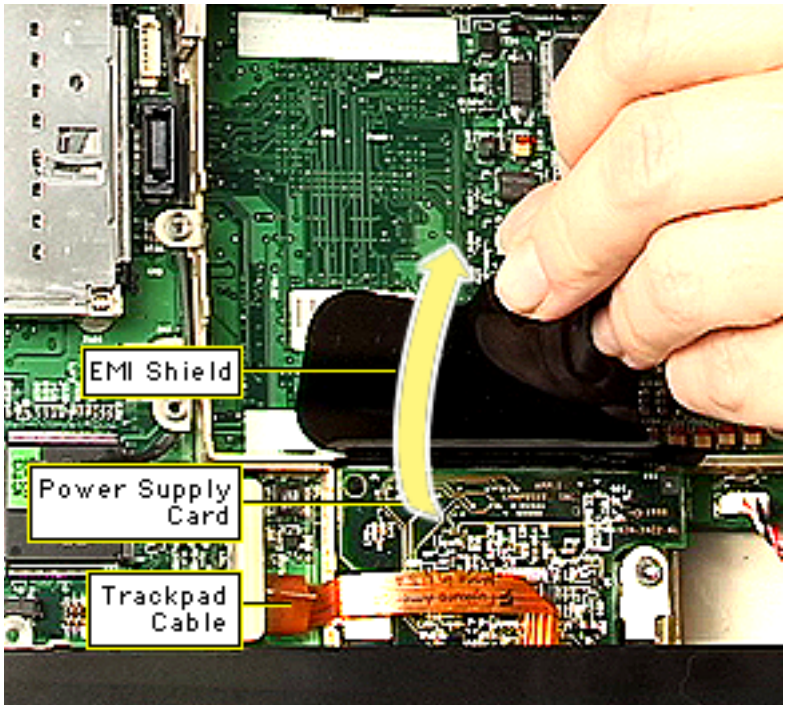
2 Remove the two black T-8 screws under the clutch cover.



3 Remove the black T-8 screw on the far right of the stiffener near the expansion bay door.

4 Remove the power button cushion.

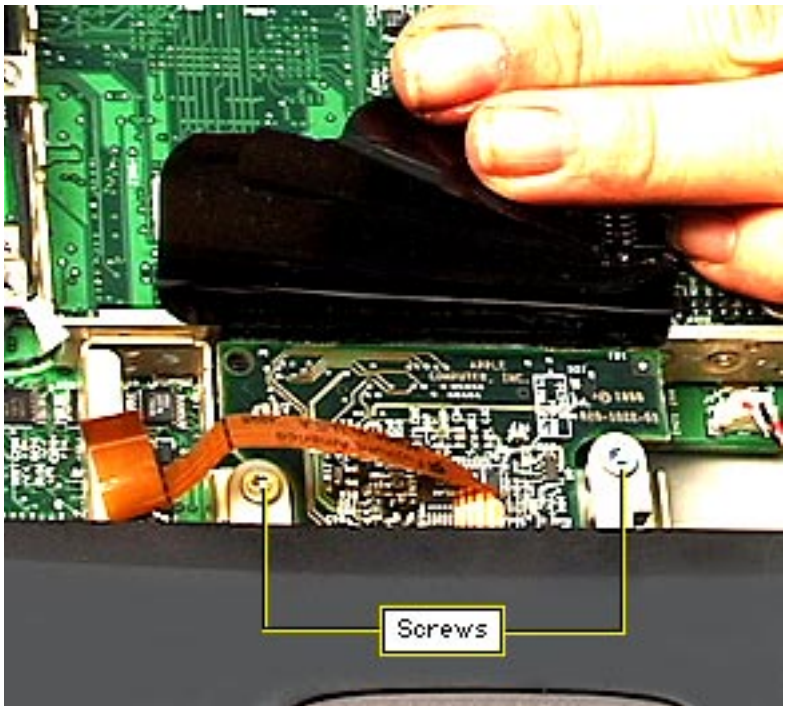
Replacement Note: Install the power button cushion with the raised side facing up.



5 Slide the black mylar EMI shield out from under the palmrest and pull it back.

6 Disconnect the trackpad cable.

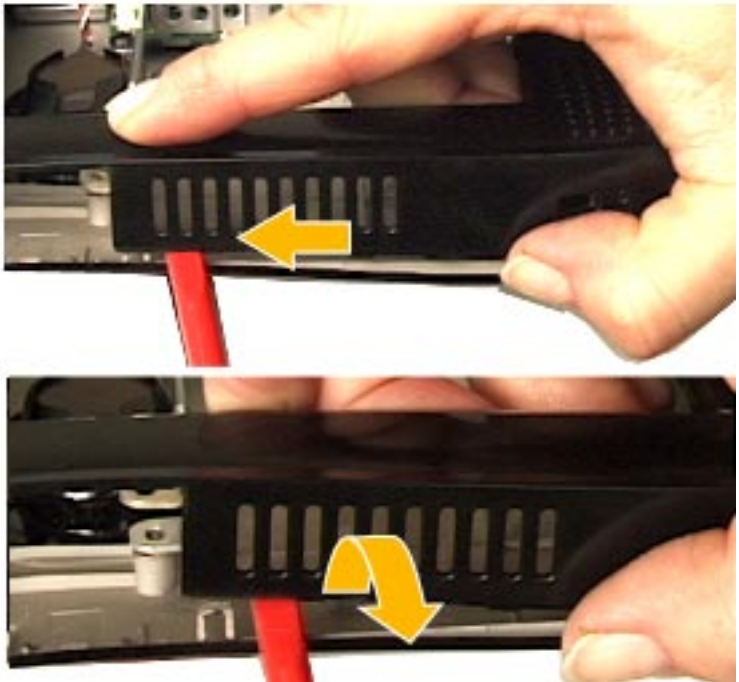
Replacement Note: If you have trouble replacing the trackpad cable, hold the service strap on top of the cable with needlenose pliers to align the pins with the holes in the connector.



7 Remove the two long silver T-8 screws on either side of the power board.

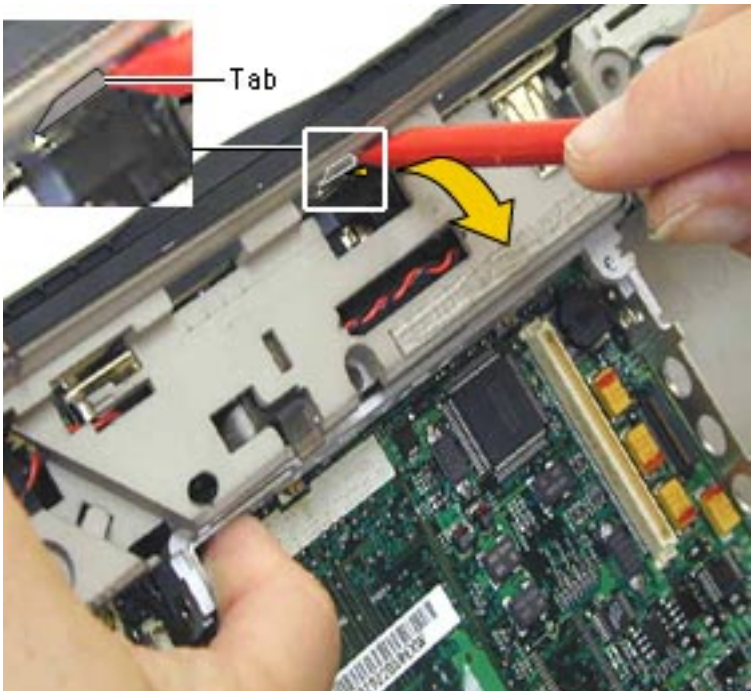
8 Remove the seven T-8 screws on the bottom case.

Replacement Note: The two long screws go in the outside holes above the expansion bay release levers.



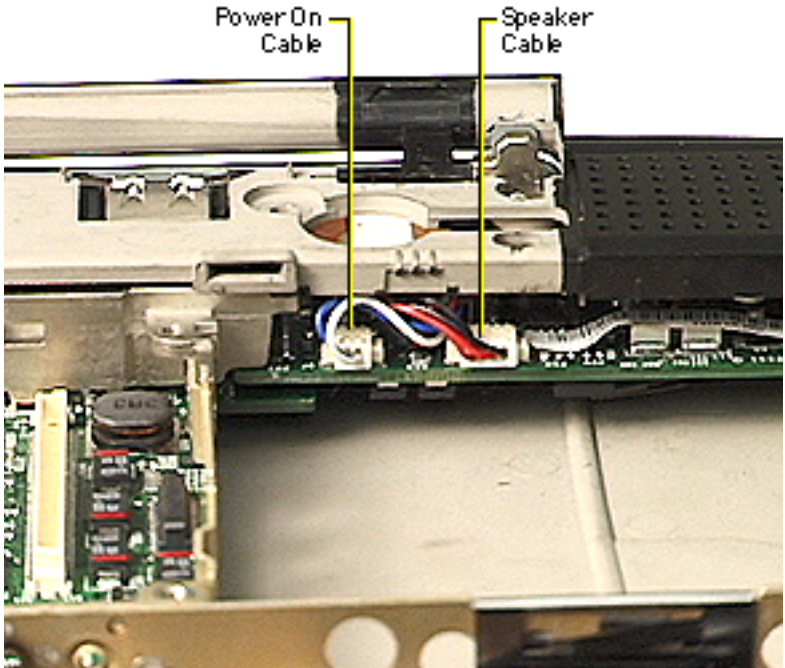
9 Locate the tab on the inside of the top case between the right expansion bay door and the vents.

10 Insert the flat end of a nylon tool into the open seam and press up against the tab until it pops apart.



11 Insert the flat end of a nylon tool between the metal I/O wall and the top case, then gently press back until the holding tab pops out of its slot.

12 Continue separating the top and bottom cases from the back to the front, releasing the tabs on the front last. Push in on the PC card eject button on the left side if the button pops out.



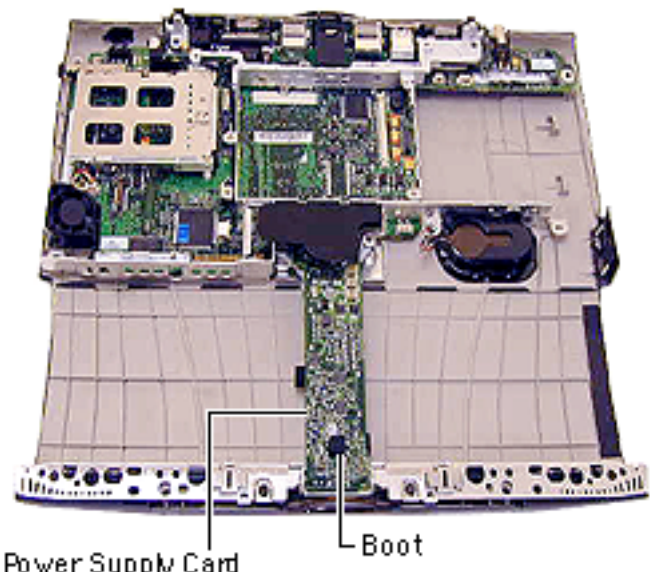
13 Disconnect the speaker cable from the sound card.

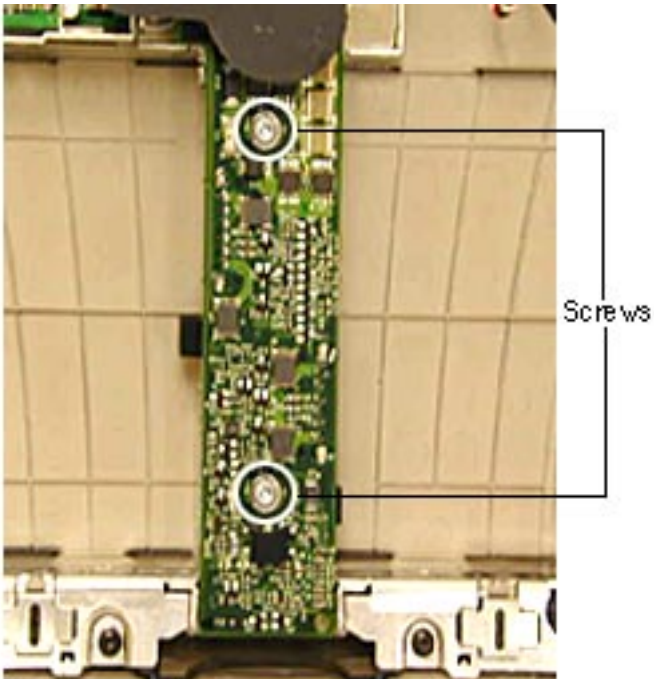
14 Disconnect the power on cable from the sound card.

Power Supply Card

Before you begin, remove the top case.

The trackpad button activator is covered by a black rubber boot. Make sure the boot is in place when reassembling the unit.

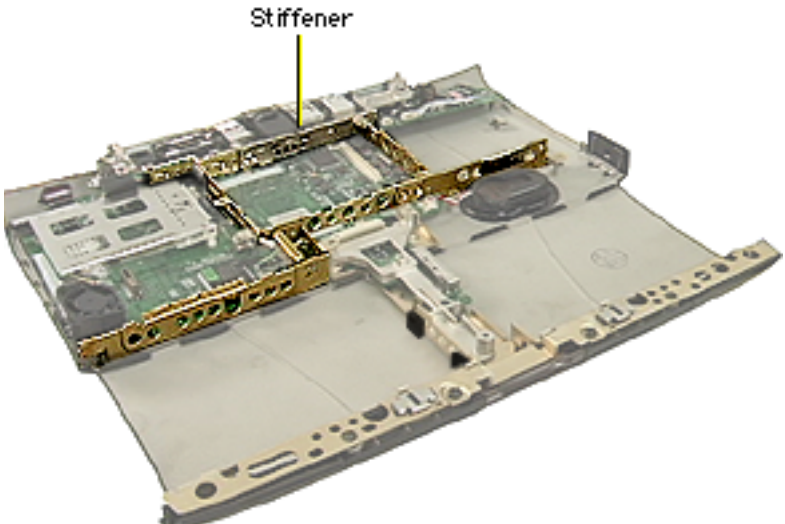




1 Remove the two silver T-8 screws in the power supply card.

2 Lift up on the top, right side of the card to release it from its connector.

Replacement Note: Do not install a power supply card without the black EMI shield attached.

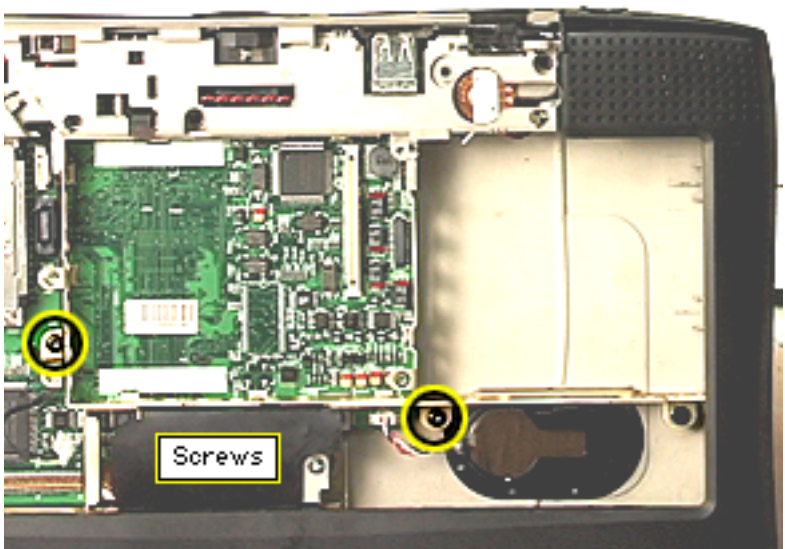


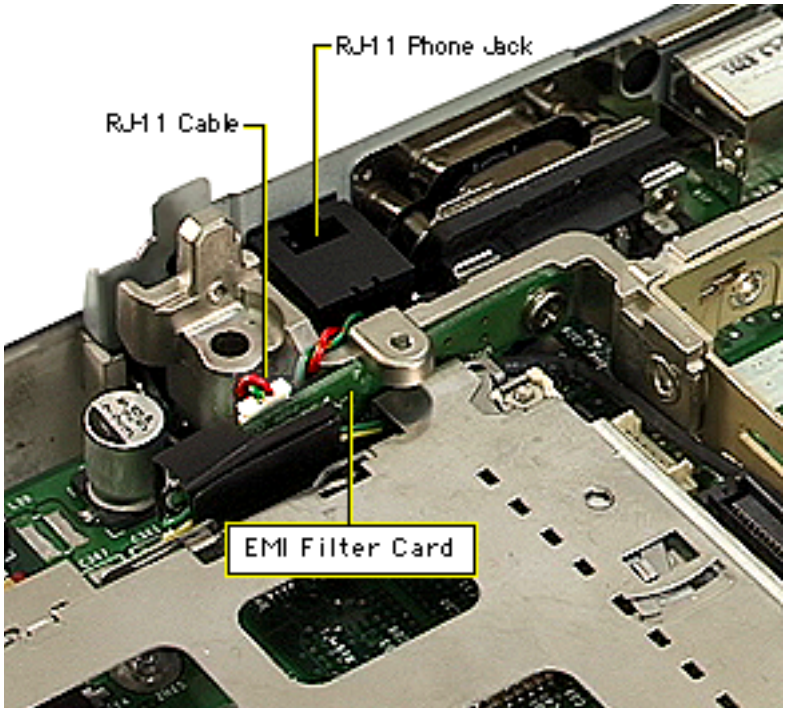
Stiffener and EMI Filter Card

Before you begin, remove the following:

- Top case
- Power supply card

1 Remove the two black T-8 screws near the backup battery and the PCMCIA cardcage.





2 Use a flat-blade nylon tool to disconnect the RJ-11 cable/phone jack from the EMI filter card. Do not pull on the cable.

3 Note the routing of the black EMI filter card cable and then lift the stiffener off the I/O logic board.

4 Use a .5 mm nut driver to remove the nut from the back of the EMI filter card.

5 Lift the board and its cable off the stiffener.

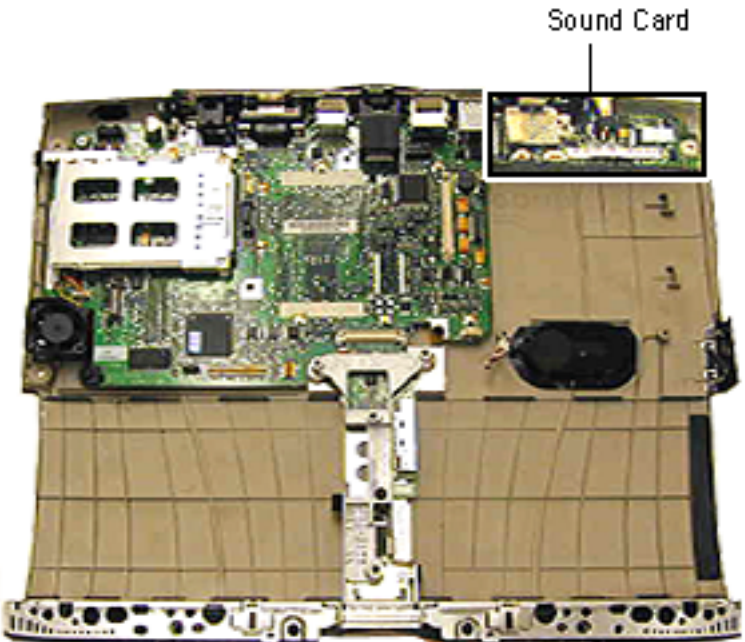
EMI Filter Card Replacement

1 Align the screw hole on the EMI filter card to the screw hole in the back left arm of the stiffener. The black EMI shield will extend to the left of the stiffener.

2 Replace the nut on the back of the stiffener.

3 Route the cable along the stiffener, under the first screw tab and over the second screw tab.

4 Make sure the black cable is not pinched under the stiffener or pinched by a screw when assembling the unit.



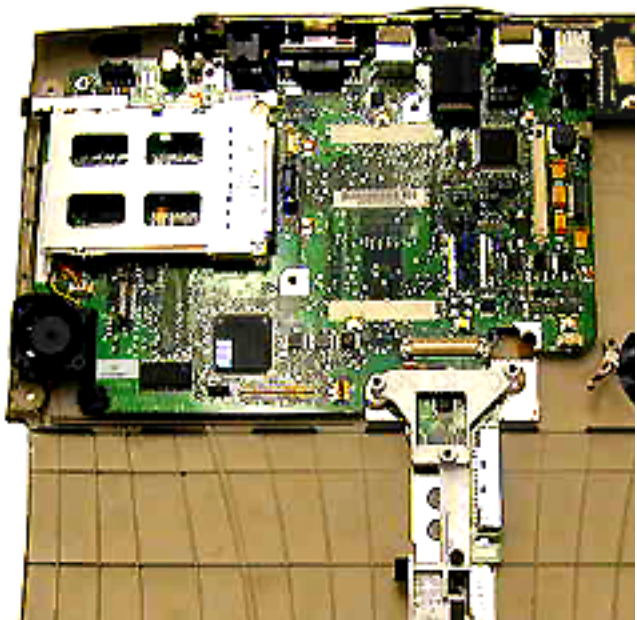
Sound Card

Before you begin, remove the following:

- Top case
- Power supply card
- Stiffener

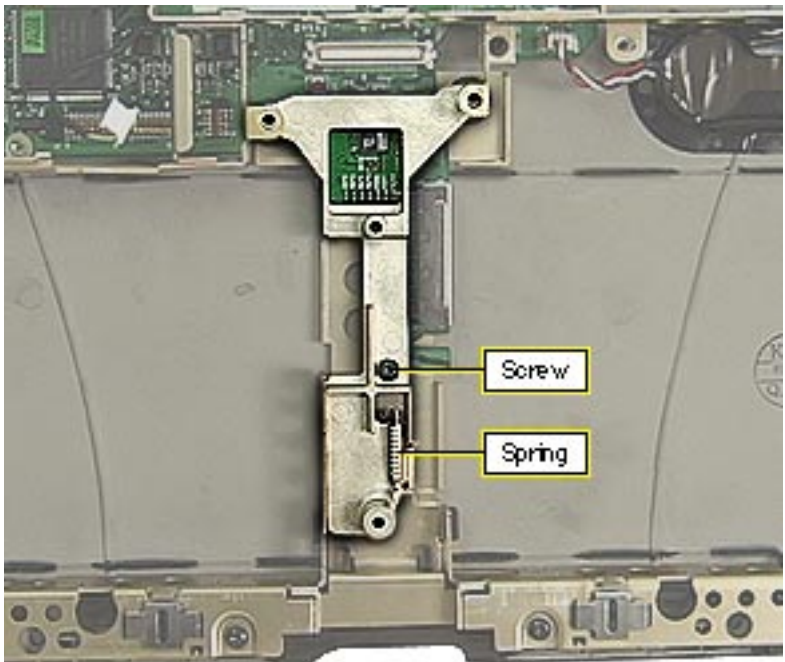
1. Flex the I/O wall back slightly and pull forward on the sound card to clear the ports from the holes in the I/O wall.
2. Lift up on the left side of the sound card to release it from its connector.

I/O Logic Board



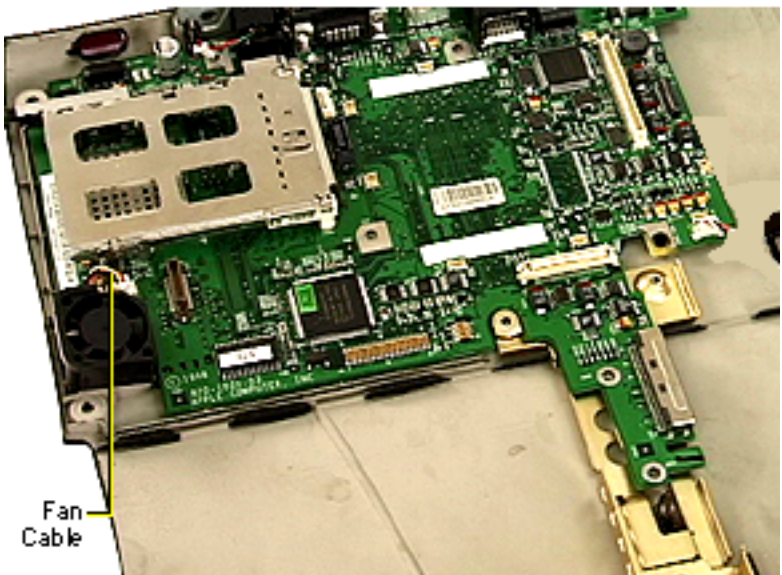
Before you begin, remove the following:

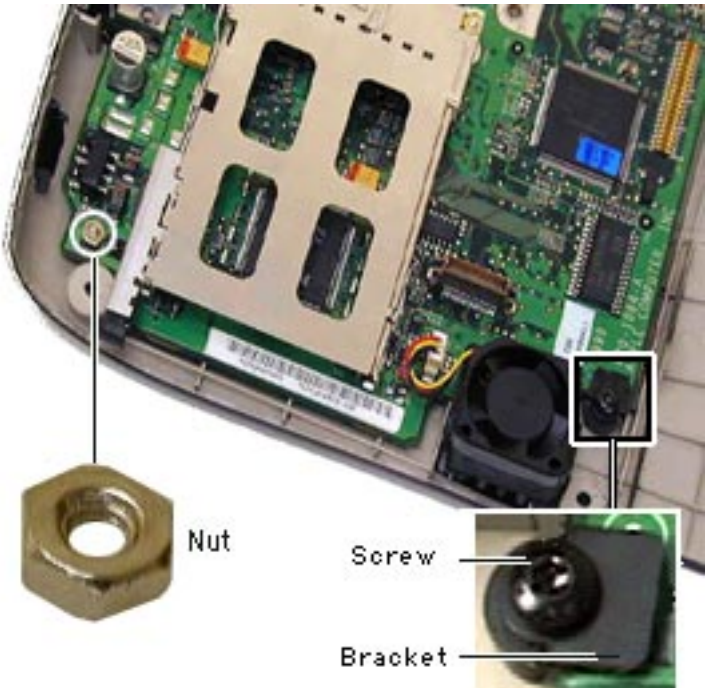
- Top case
- Power supply card
- Stiffener
- Sound card



1. Remove the black T-8 screw from the yoke.
2. Press in on the display latch and unhook the spring from the latch.
3. Remove the spring from the yoke.
4. Remove the yoke.

5 Disconnect the fan cable from the I/O logic board.



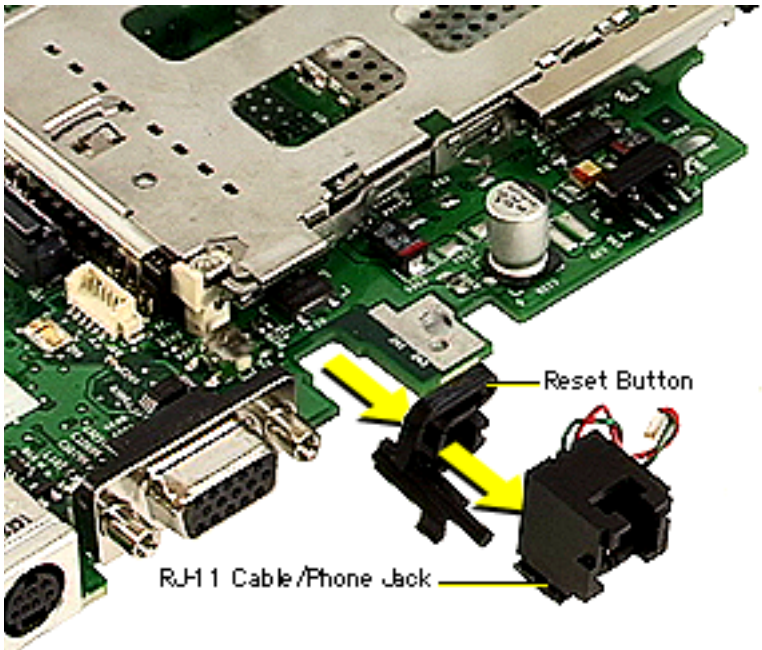


6 Remove the T-8 screw and the bracket from the front, left corner of the board, next to the fan.

7 Use a .5 mm nut driver to remove the nut from the back, left corner of the board.

8 Lift up on the front and side of the I/O logic board and pull forward on the board until it clears the I/O wall at the rear.

Caution: Do not use the narrow part of the board as a



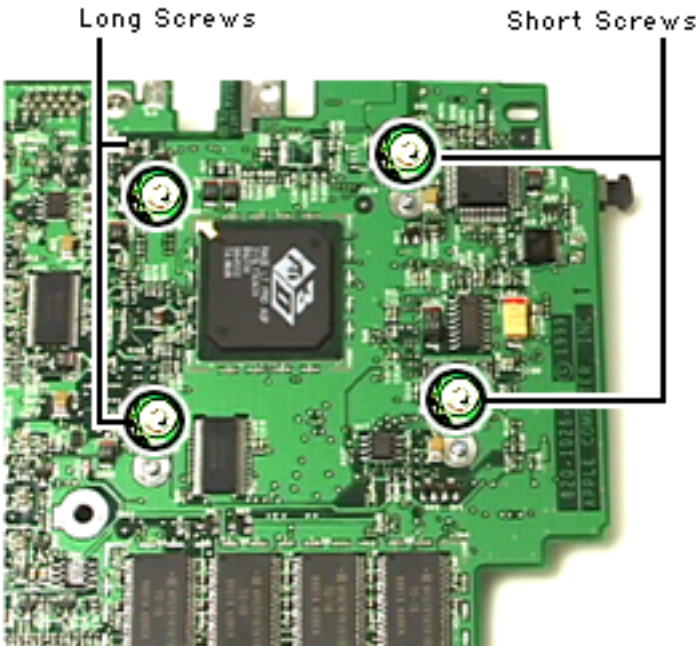
handle. The board could break at this point.

9 Slide the RJ-11 cable/phone jack off the back of the I/O logic board.

10 Slide the reset switch off the board.

Replacement Notes: Align the reset switch so the long post is on the bottom and extends to the outer edge of the board. Align the channels on the switch to the edges of the board and slide the switch onto the board.

Position the RJ-11 cable/

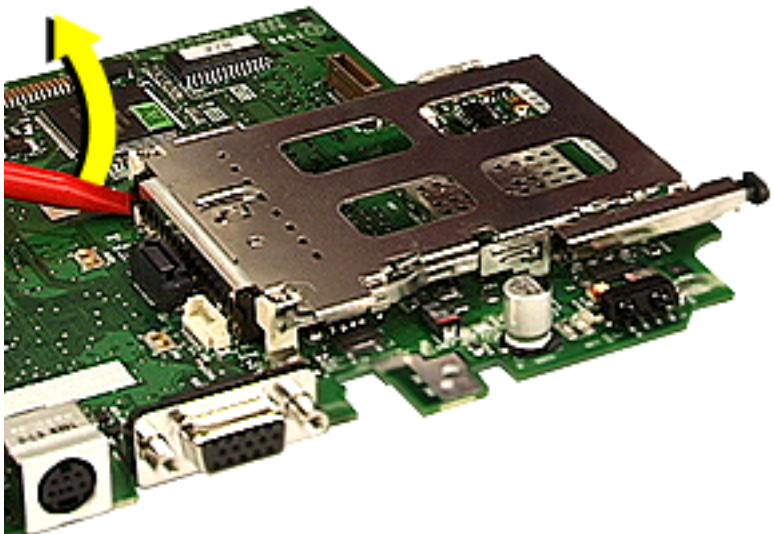


phone jack so the wires extend up the phone jack and over the top. Align the channels to the edges of the board and slide the RJ-11 phone jack on.

PCMCIA Cardcage

Note: The PCMCIA cardcage consists of two pieces that can come apart. To avoid alignment problems, it is important not to separate the two pieces.

1 Turn the I/O logic board over and remove the four

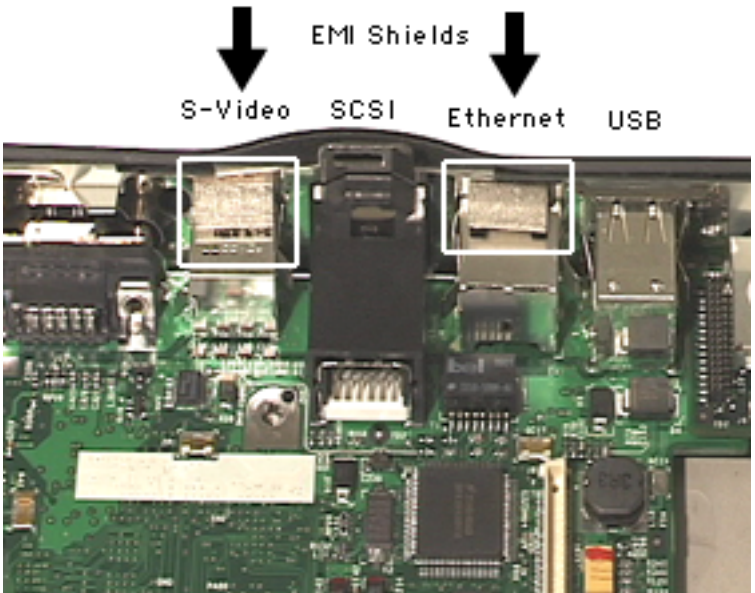


Phillips screws holding the PCMCIA cardcage on.

Replacement Note: The two short screws go in the holes near the outside edge of the board.

2 Use a flat-blade nylon tool to separate the cardcage from its connector.

3 Grasp the bottom edges of the cardcage and pull straight up. Do not pull on the top edges of the cardcage or the cardcage could come apart.



I/O Logic Board EMI Shields

If you install a new logic board, you must also install the two EMI shields that shipped with it.

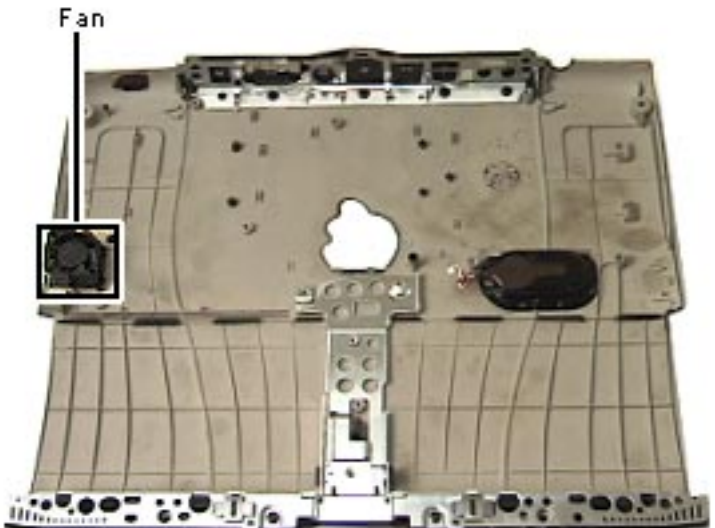
1 Peel the paper backing off the EMI shields.

2 Place the shields on top of the Ethernet and S-Video ports so that the back edges of the shields touch the metal I/O wall.

3 Verify that the EMI shields touch the metal I/O wall.

4 Press down firmly on both shields at the same time to set the adhesive.

Important: Make sure you press on both shields at the same time, or you could flex one side of the I/O wall enough so that the second shield doesn't make firm contact with the wall.



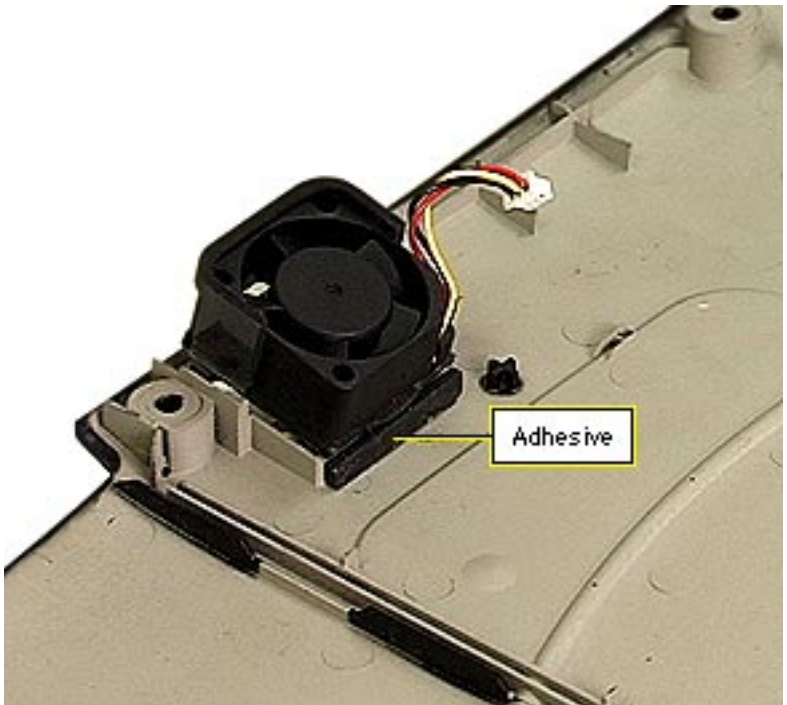
Fan

Before you begin, remove the following:

- Top case
- Power supply card
- Stiffener
- Sound card
- I/O logic board

Peel the fan off the bottom case and lift the fan out.

Replacement Note: Remove the backing from the adhesive strip on the fan. Place the fan in its holder over the vents. Fold the



adhesive strip over the right edge of the holder, ending flush against the bottom case.

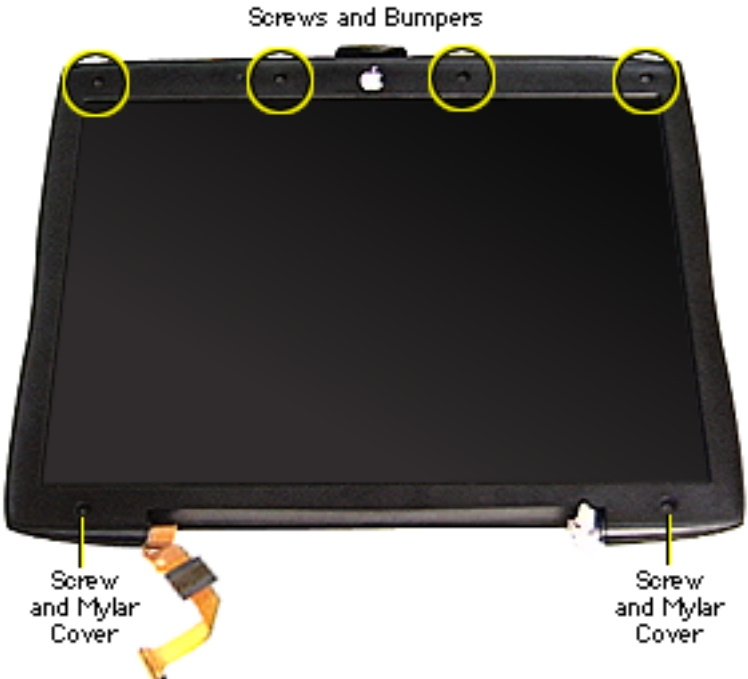
Display (International Only)

Repairs to the display are handled only by the CPRC in the United States. See the Basics chapter of this manual for information on repair strategy in the US and Canada.

Repair strategy varies in international regions.

Note: The display uses vendor-specific brackets, display cables, and foam stiffeners. To identify the manufacturer of the display, remove the heatsink and look for the manufacturer's name (LG or Samsung) stamped on the display cable.

The Samsung display has three EMI pads on each brace. If you replace a Samsung display, make sure the EMI pads are in place on the braces.



Display Housing

Before you begin, follow the procedures to remove the display module from the bottom case.

1 Use an Exacto knife or razor blade to pry up the two mylar screw covers at the bottom of the display bezel.

2 Use the pointed end of a nylon tool to pry the four display bumpers from their recesses.

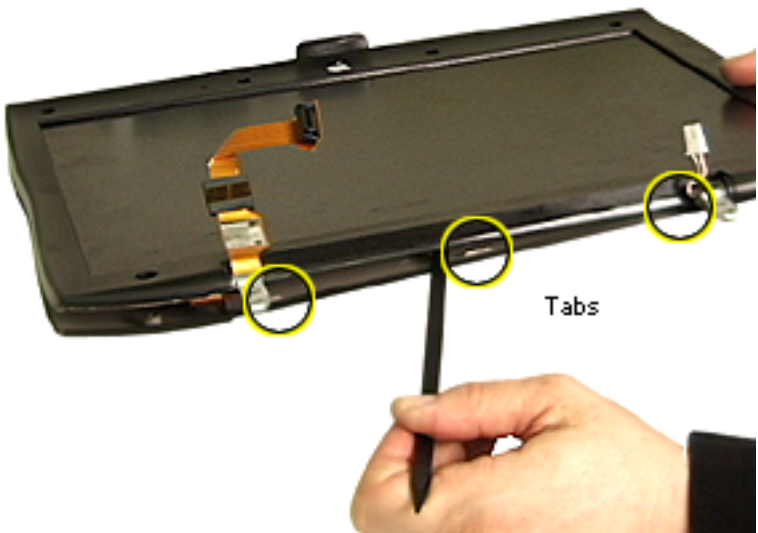
Note: The adhesive on the

backs of the screw covers and bumpers must be kept clean or they will not adhere properly when reapplied. Use new parts if the ones you removed are damaged or dirty.

3 Remove the two Phillips screws on the bottom of the bezel.

4 Remove the four Phillips screws on the top of the bezel.

Replacement Note: All Phillips screws in the display are the same size.



5 Insert the flat end of a nylon tool into the seam between the clutches and work it along the seam to pop open the three tabs.

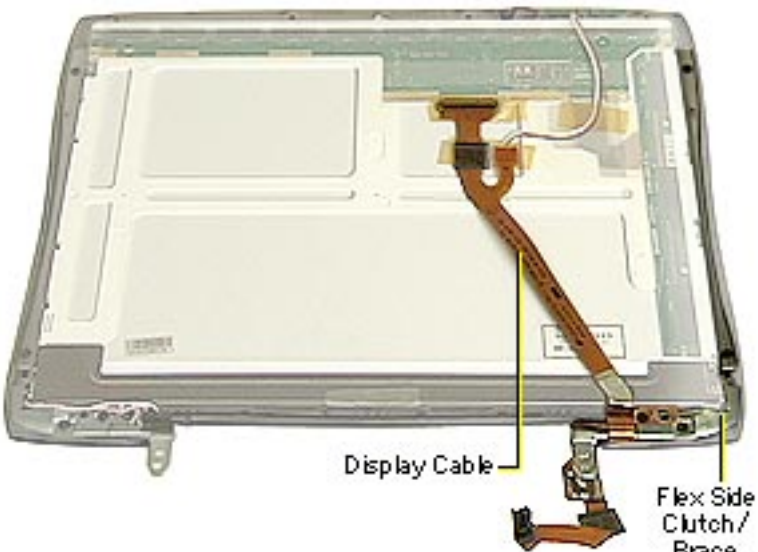
6 Work the nylon tool along the seam on each side of the display clamshell and open the three tabs on each side of the display.

7 Remove the foam stiffener from the housing. The foam may be held in place with double-stick tape.

Note: The foam stiffener kit contains a stiffener for each manufacturer's display. Check the labeling to make sure you use the right stiffener for the display you install.

Replacement Notes: Align the notch on the left side of the foam stiffener to the square EMI shield. Hold the housing to the light to make sure the edge of the foam does not show through the logo. Check the alignment again after replacing the LCD and before you replace the screws.

You may use double-stick tape at the corners of the foam to help hold it in place during reassembly.

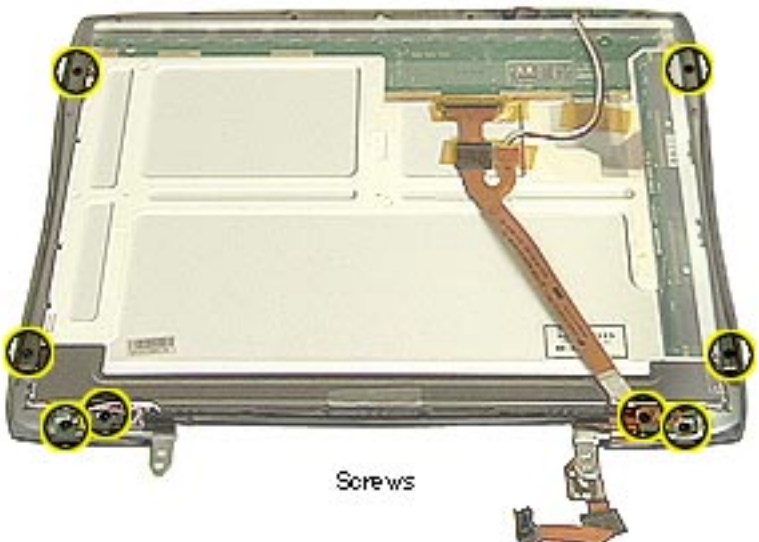


Display Cable and Flex Side Clutch/ Brace

Before you begin, remove the following:

- Display module
- Display housing

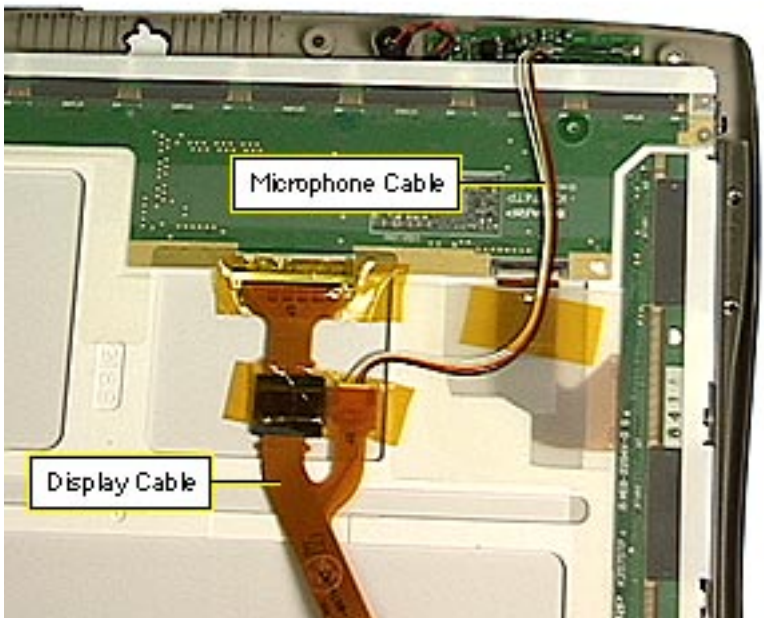
Caution: Do not press on the back of the display panel with your hand or any other object. Bright spots in the display could result.



1 Remove the two Phillips screws on both the left and right clutches (four screws total).

2 Remove the two Phillips screws on both the left and right braces (four screws total).

3 Remove and set aside any kapton tape holding the display cable and microphone cable in place.



4 Disconnect the microphone cable from the display cable.

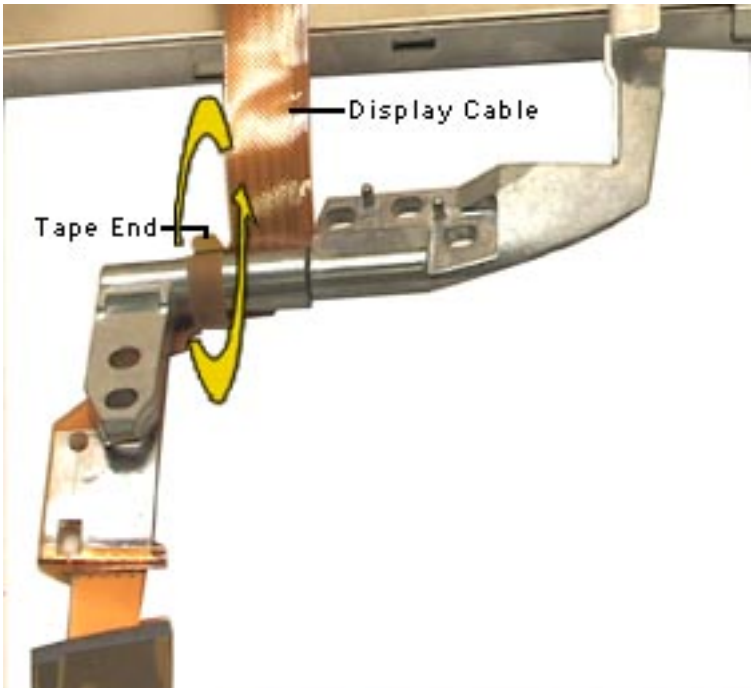
5 Disconnect the display cable from its connector.

6 Lift the LCD panel away from the bezel.

Screws

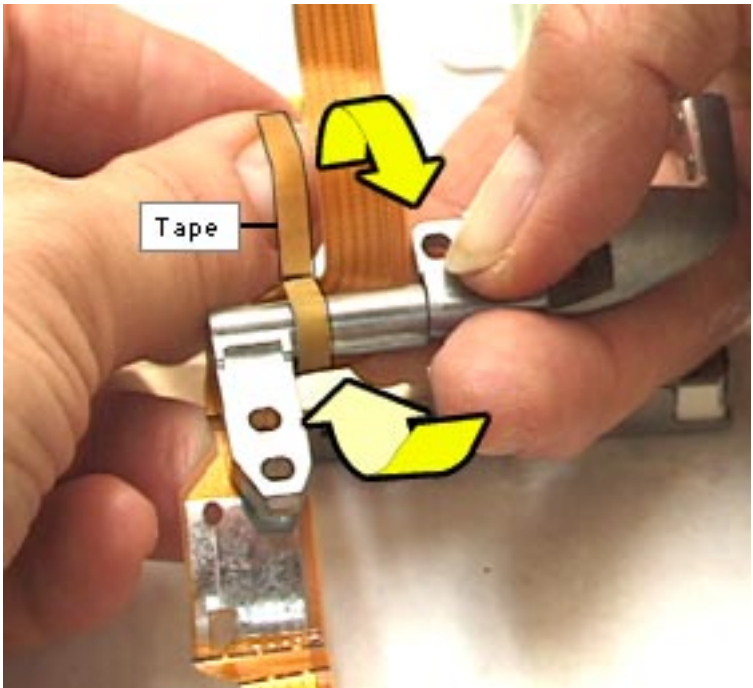
7 Remove the two T-8 screws on the side of the display cable brace.

8 Pull the display cable tab off its retaining post on the clutch and unwrap the cable as far as you can.



9 Peel up the end of the tape on the left of the display cable and unwind it from the clutch.

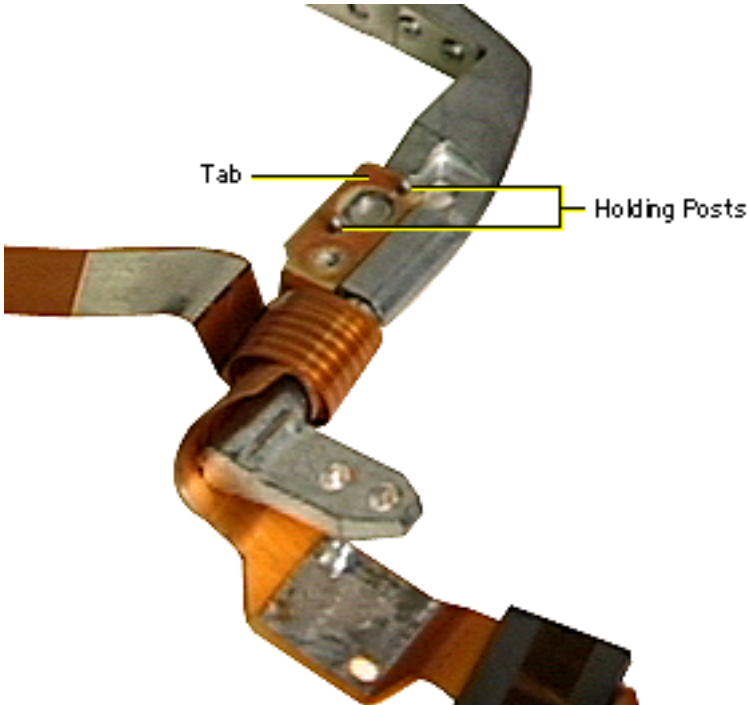
10 Remove the cable from the clutch.



Display Cable Replacement

1 Lay the display cable down so that the flat connector that fits in the back of the LCD panel extends up and away from you.

2 Wrap the adhesive tape around the clutch securely.



3 Fit the tab over the holding posts on the clutch.

4 Wrap the cable away from you and bring the cable around the clutch so that the bend in the cable rests at the top of the clutch.

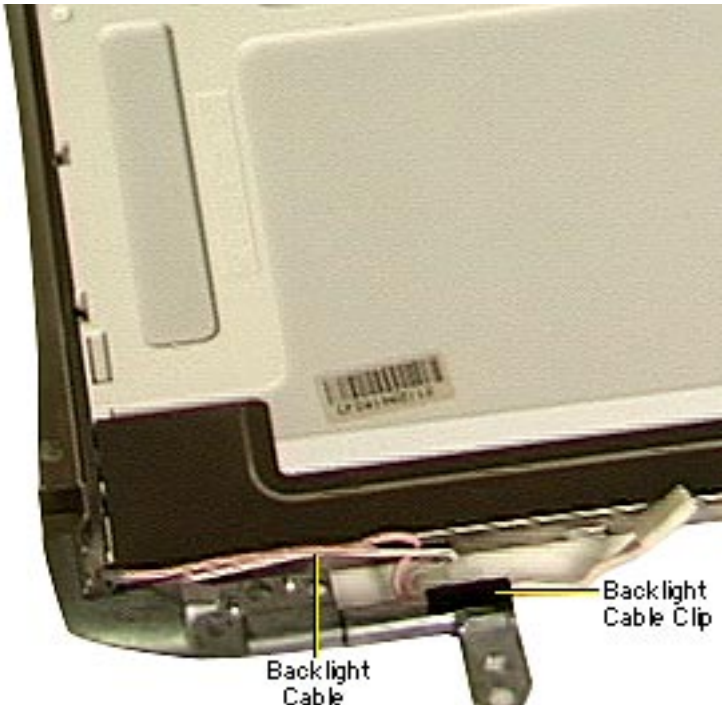
If properly wrapped, the display cable will lay under the clutch and extend down and away from the display. The long, straight part of the cable will extend up and away from you.

LCD Panel

Before you begin, remove the following:

- Display module
- Display housing
- Flex side clutch/brace

1 Remove the two T-8 screws on the left side of the wire side clutch/ brace.



2 Slide the backlight cable clip off the clutch and pull the clutch/brace away from the LCD panel.

Replacement Notes: Lay the two wires of the backlight cable over the clutch so that the ridge on the clutch is between them. Place the thicker wire in the thicker groove.

The wires should extend 8.0 mm past the end of the clutch. Slide the clip over the end of the clutch to hold the wires in place.

Additional Procedures

PowerBook G3 Series (Bronze Keyboard)

Memory Upgrade

The PowerBook G3 Series (Bronze Keyboard) has two memory card slots on the microprocessor board: one on the top (user-accessible) and one on the underside. There is no RAM soldered on the I/O logic board.

The underside slot can accommodate a 1.5-inch SO-DIMM with up to 128 MB of SDRAM. The top slot can accommodate a 2.0-inch SO-DIMM with up to 256 MB of SDRAM.

The PowerBook G3 Series (Bronze Keyboard) supports 16, 32, 64, 128, or 256 MB SO-DIMMs for a total of up to 384 MB.

Note: Use SO-DIMMs only. EDO devices may fit in the slots, but death chimes will be heard at startup.

Top Slot

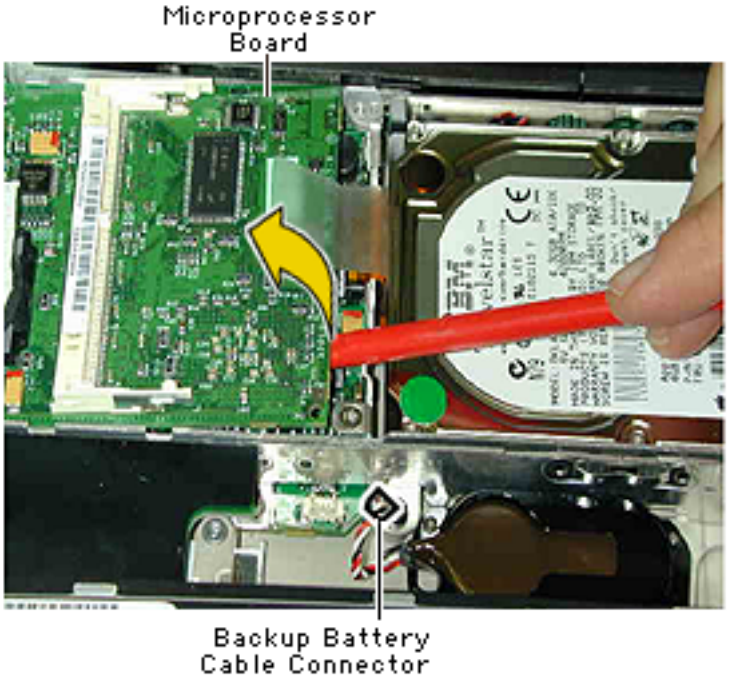
Before you begin, refer to the Take Apart chapter of this manual to remove the following:

- AC adapter
- Expansion bay modules
- Keyboard
- Heatsink

1 Pull the plastic snaps on either side of the RAM card to the sides. The card will tilt up.

2 Pull the RAM card out.

3 Hold the RAM card at a 30-degree angle and line



up the notch in the RAM card with the small plastic tab in the RAM expansion slot. Push in on the card and then down until the two plastic snaps click into place.

Underside Slot

1 Lift up on the right side of the board with a nylon tool.

2 Pull the board to the right until the tabs on the left clear the slots in

the stiffener.

3 Follow steps 1—3 above to replace the Ram card.

4 Insert the tabs on the left of the microprocessor board into the corresponding slots in the stiffener and press down firmly on the microprocessor board to make sure it is firmly seated.

Note: Make sure the hard drive tab is not caught under the microprocessor board when you replace the board.

Caution: The heat spreader on top of the microprocessor may loosen and stick to the bottom of the heatsink. Make sure that the microprocessor has a heat spreader in place if you replace either the microprocessor board or the heatsink.

Backup Battery Shim Installation

The backup battery shim prevents the backup battery from moving around inside its case. Follow the instructions below to install the shim.

1. Remove all power sources to the computer (battery module and AC adapter).
2. Remove the expansion module from the right expansion bay.

3 Disengage the keyboard and flip it back over the palmrest to access the backup battery.

4 Bend the backup battery shim in half and slip it into the battery case on top of the backup battery.

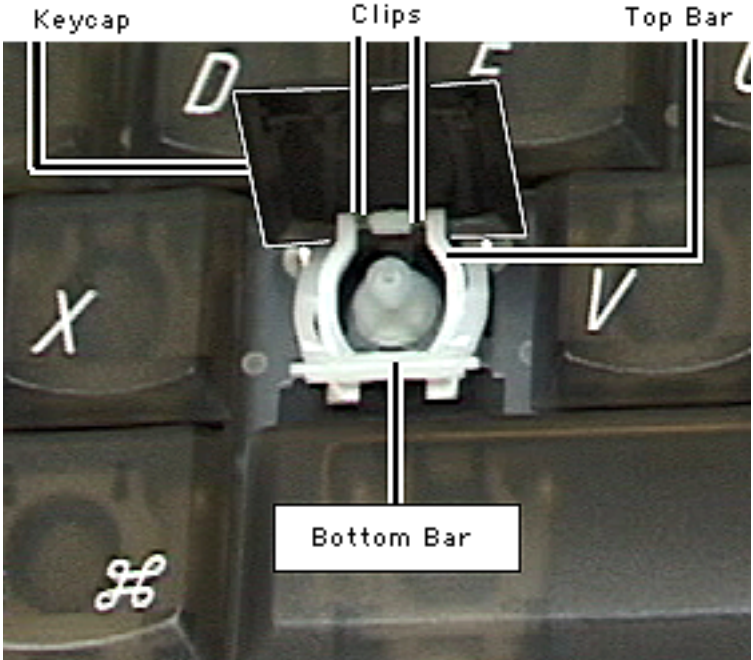
5 Slide the shim in until it reaches the far end of the case.

6 Pull up any edges of the case caught under the shim.

Keycap Replacement

Two basic types of keycaps are on the keyboard. The smaller number, letter, function, and arrow keys can be very easily snapped back in place if they come off. The large keys (such as the spacebar) require more care to replace them.

The procedures that follow show how to replace both types of keycaps if they come all the way off. The orientation of alignment points vary depending on the particular key. The procedures are generic and require modification depending on the key.

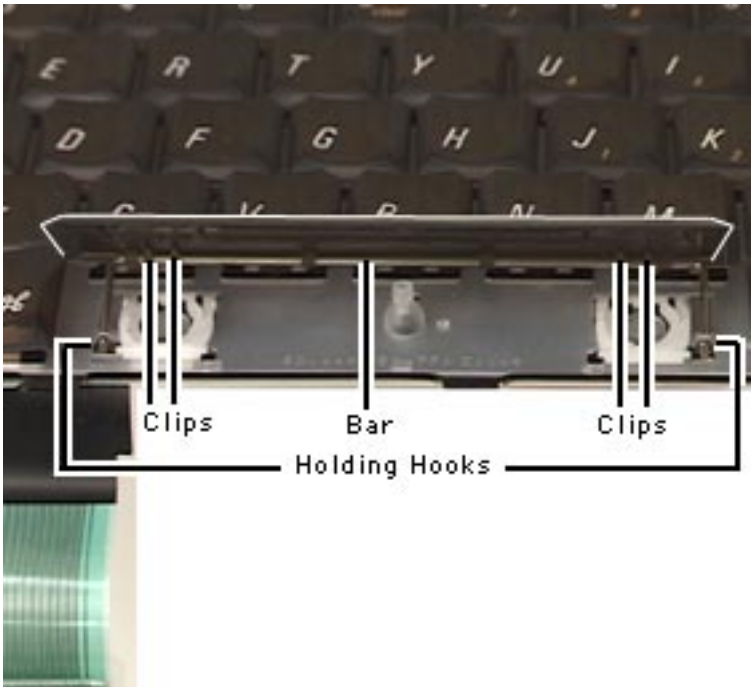


Small Keys

1 Lift up on the bottom bar of the holding clip.

2 Position the two clips on the back of the keycap over the top bar of the holding clip until they snap in place.

3 Flip the keycap over and press down on it until you feel and hear it snap into place.

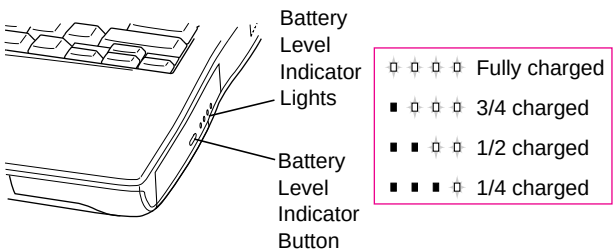


Large Keys

1 Position the long arm of the U-shaped metal bar over the holding clips on the underside of the keycap and snap it into place.

2 Fit the ends of the U-shaped metal bar into the holding hooks on the keyboard.

3 Flip the keycap over and press down on it until you feel and hear it snap into place.



Battery Verification

The Control Strip on the desktop indicates the battery charge and the rate at which the battery is being used.

PowerBook G3 Series (Bronze Keyboard) batteries have level-indicator lights that show whether the battery is fully charged, three-fourths charged, one-half charged, or one-fourth charged.

Before the lights will report

levels correctly, the battery must be fully discharged and recharged to calibrate the battery. After this calibration, the lights will report charge levels properly.

To determine the actual battery charge, push in the level indicator button to activate the indicator lights.

Note: If more than one light is blinking, there is a problem with the battery. If only one light is blinkinig, the battery is fully depleted and should be charged soon.

Power Adapter Verification

No test is available for verifying the power adapter. Try using a new power adapter if the computer cannot run off the existing one.

Backup Battery Verification

The backup battery saves the PRAM and power management information on the I/O logic board when the computer is shut down. To check that the backup battery is working, follow the procedures below.

1 Verify the backup battery is connected to the I/O logic board.

2 Set the date, time, and time zone.

3 Select Shut Down from the Apple Menu or Special menu.

4 Remove the main battery and disconnect the power adapter for 10 minutes.

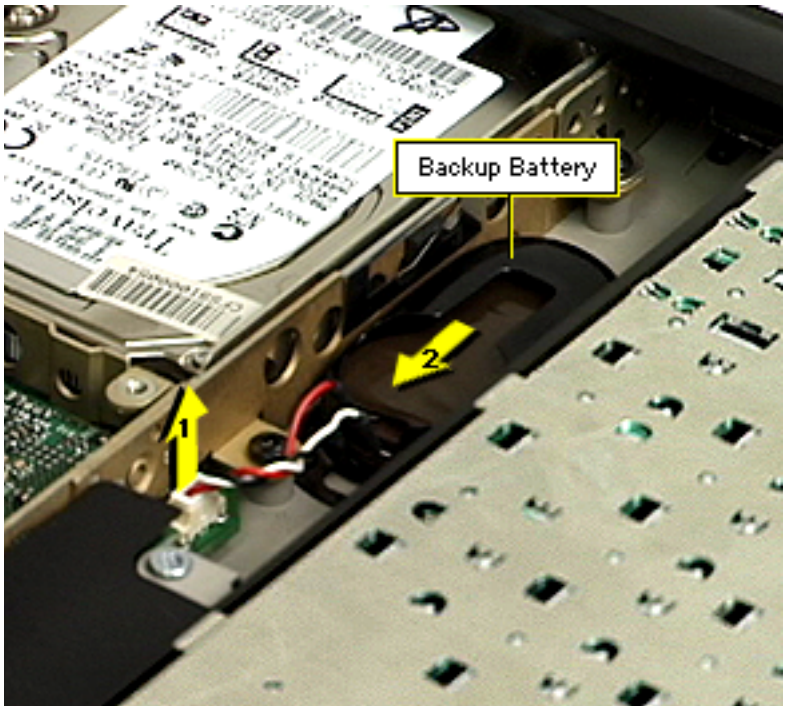
5 Connect the power adapter, insert the battery, and power on the computer.

6 If the date and time were lost, the backup battery may be

dead or discharged.

7 To recharge the backup battery, leave the PowerBook plugged in for 48 hours. It is okay to use it while it is charging.

8 If the backup battery appears dead or will not charge, replace the backup battery.



Backup Battery Replacement

Before you begin, remove the following:

- A/C adapter
- Expansion bay modules
- Keyboard

1 Disconnect the backup battery from the I/O logic board.

2 Pull the battery out of its holder.

PRAM and Power Manager Reset

Caution: Resetting PRAM erases the contents of the RAM disk, if there is one. Resetting PRAM also restores the default settings in most control panels. After you reset PRAM, be sure to check any custom settings for the desktop pattern, memory, network, AppleTalk, trackpad, power conservation, and so forth.

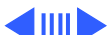
Resetting PRAM

Reset/zap PRAM from the shutdown state. Follow these steps to reset PRAM:

1 Power on the computer by pressing the Power key.

2 Immediately hold down the Option-Command-P-R keys.

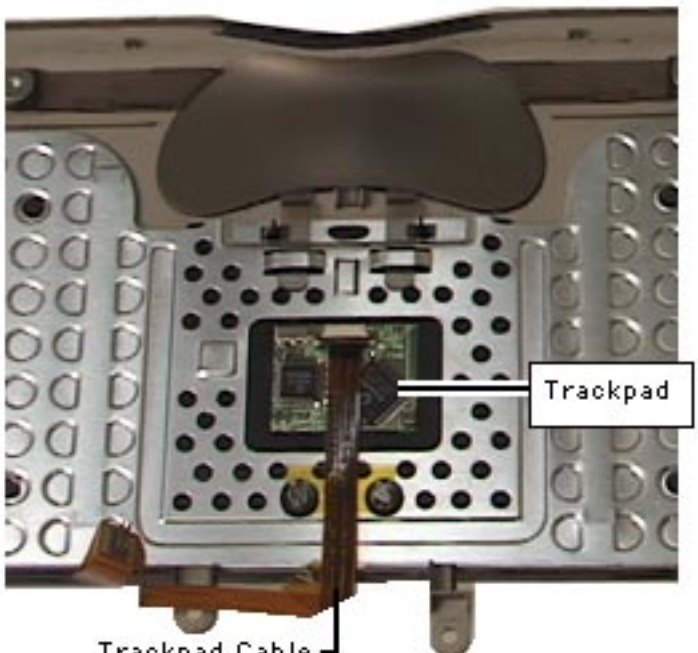
3 Hold down these four keys until you have heard the



startup chime at least one additional time after the initial startup chime.

Resetting the Power Manager

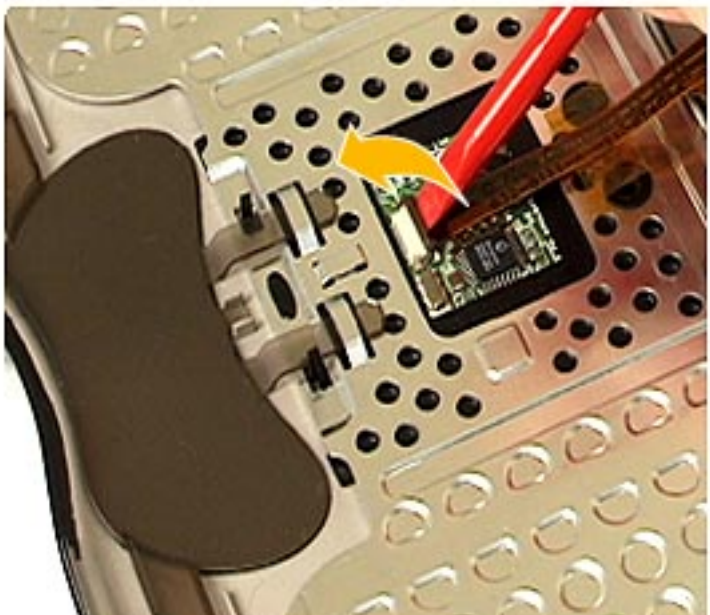
PowerBook G3 Series (Bronze Keyboard)computers have a reset button located on the back of the computer behind the I/O door. Press the button once to reset the power manager.



Trackpad Cable

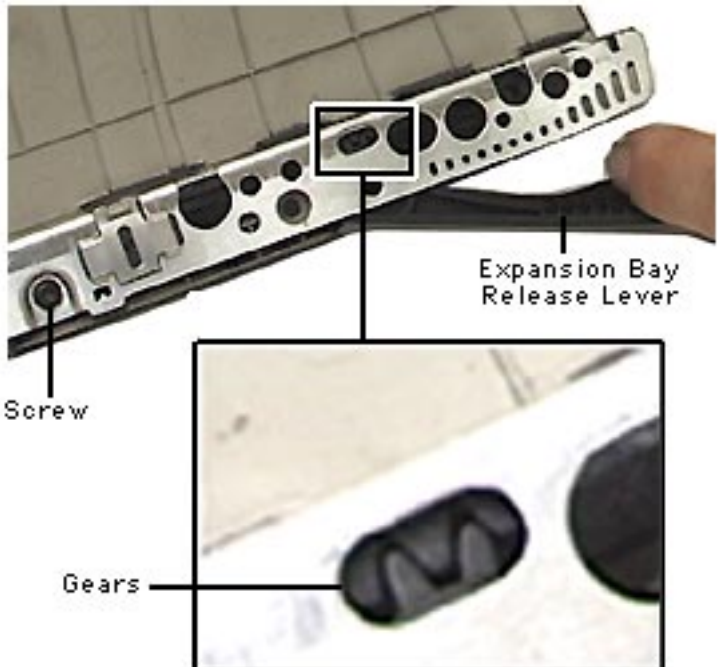
Before you begin, remove the following:

- A/C adapter
- Expansion bay modules
- Keyboard
- Modem
- Heat sink
- Hard drive
- Microprocessor board
- Clutch cover
- Inverter board
- Display module
- Top case



1 Use the flat end of a nylon tool to lift the black part of the connector up.

2 Loosen the kapton tape over the trackpad cable connector and slide the cable out.



Expansion Bay Release Lever Adjustment

If the expansion bay release lever comes out of alignment and cannot eject the expansion module or battery out of the bay, a simple adjustment to the release lever mechanism will fix the problem.

Before you begin, follow the procedures for removing the top case in the Take Apart chapter of this manual.

1 Loosen the screw on the stiffener close to the expansion bay release lever that is misaligned.

2 Move the release lever back and forth until the teeth in the lockpawl engage in the gears.

3 Tighten the screw to lock in the alignment.

Sprung I/O Door Repair Procedure

An I/O door is sprung if it will not close all the way and has no snap to it. It is not necessary to take the unit apart to get the door back on its spring.

1 Grasp the top and bottom edges of the I/O door in the center of the door.

2 Pull the I/O door away from the back of the computer in an even motion, keeping the bottom and the top of the door aligned. It may be necessary to hook the bottom lip of the I/O door with a fingernail to avoid tilting the door.

3 Pull the I/O door out approximately five to ten millimeters (0.2 to 0.5 inches) from the I/O

wall until you hear a pop.

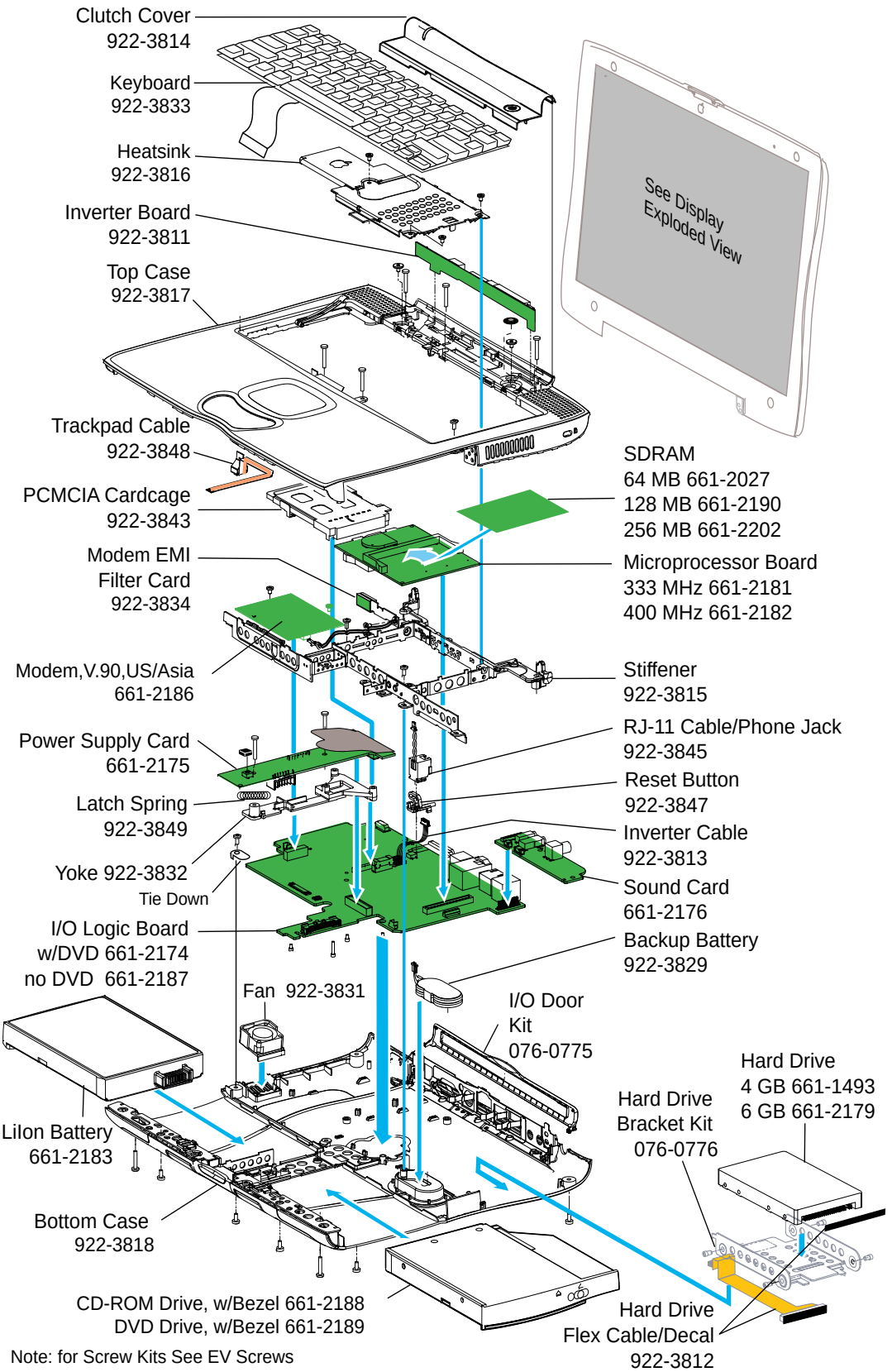
4 Still holding the I/O door with your fingers, rotate it to the closed position and let it relax back into place. You will hear another pop as the spring goes back into its proper position.

5 Open and close the I/O door several times to make sure it operates properly.

Exploded View

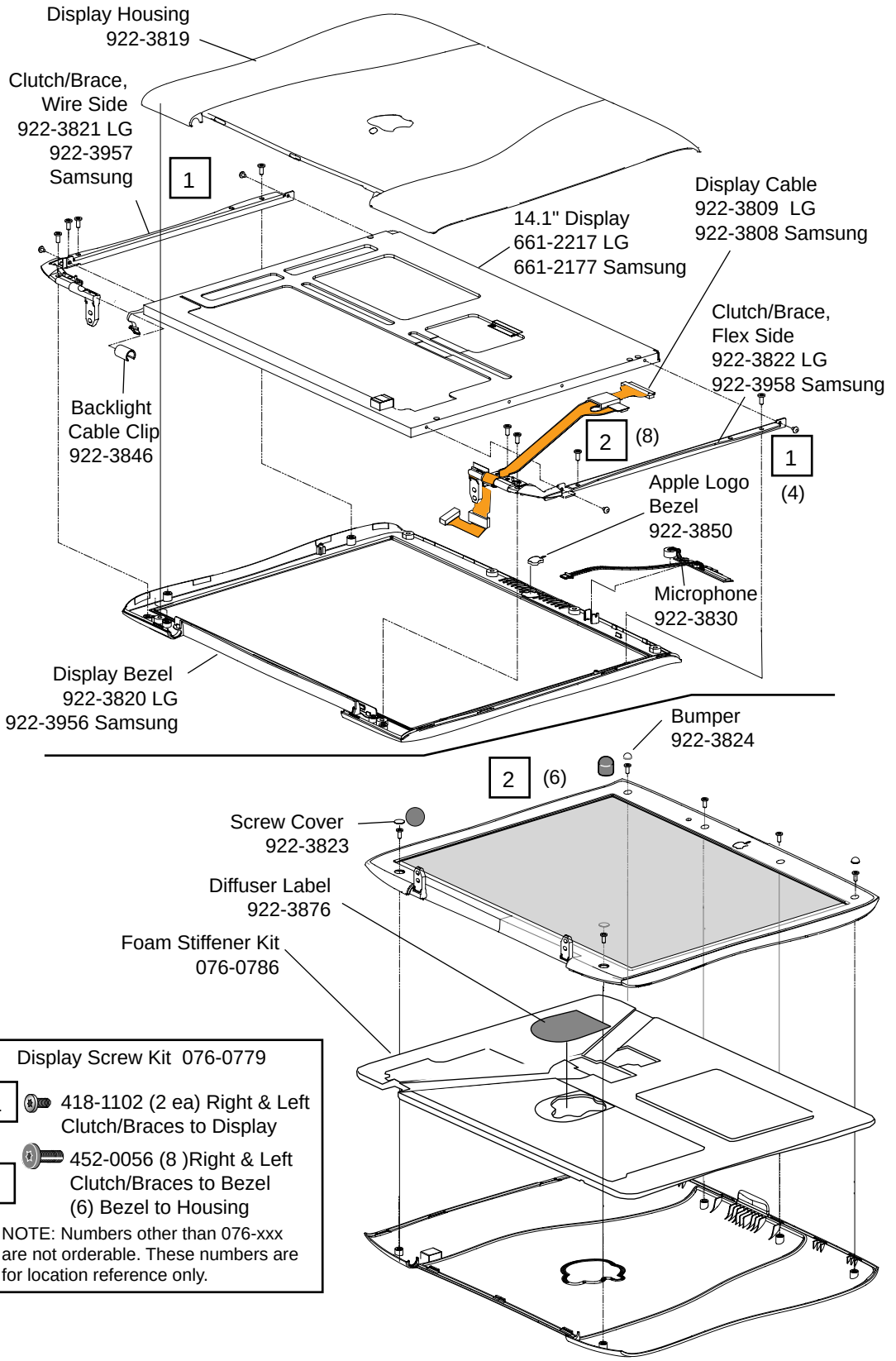
PowerBook G3 Series (Bronze Keyboard)

PowerBook G3 Series (Bronze Keyboard) Main Exploded View



Note: for Screw Kits See EV Screws

PowerBook G3 Series (Bronze Keyboard) Display Exploded View



Display Screw Kit 076-0779

1 — 418-1102 (2 ea) Right & Left Clutch/Braces to Display

2 — 452-0056 (8)Right & Left Clutch/Braces to Bezel
(6) Bezel to Housing

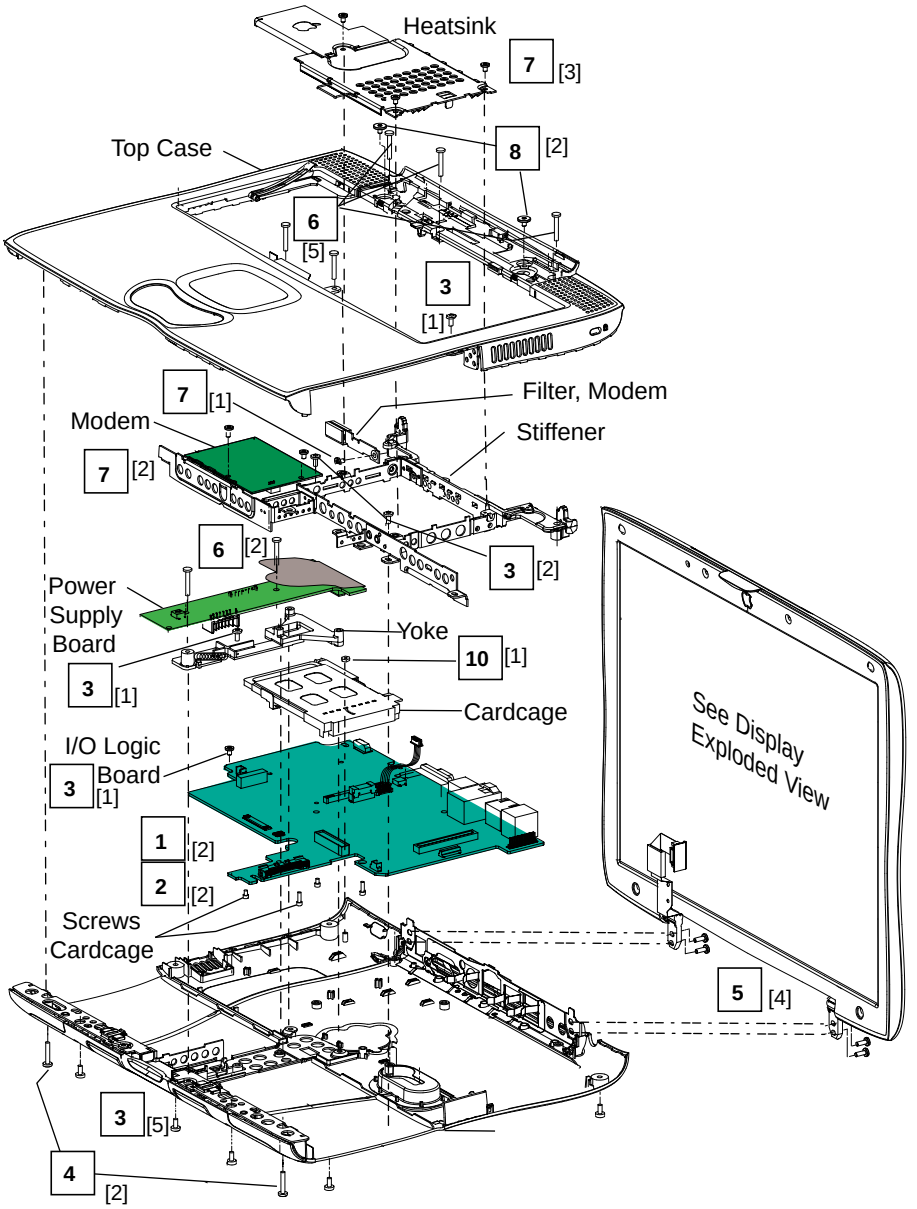
NOTE: Numbers other than 076-xxx are not orderable. These numbers are for location reference only.

PowerBook G3 Series (Bronze Keyboard) Screw Matrix Exploded View

076-0781 Screw Kit

1	410-1103 (2) PC Card Cage	6	417-8216 (7) [5]Top Case Down [2] Power Supply Board
2	410-1011 (2) PC Card Cage	7	417-8235 (6) [3] Heatsink, [2] Modem, [1] Modem Filter Board
3	417-5205 (9) [5] Bottom Case up, [1] Yoke [1] thru Tie Down, [2] to Stiffener, [1] Top case Expansion Bay Side	8	452-0043 (2) Top Case to stiffener
4	417-5214 (2) Bottom Case Up	9	452-0054 (4) Hard Drive Bracket to Hard Drive
5	418-8207 (4) Display to CPU I/O	10	835-0103 (1) I/O Logic Board

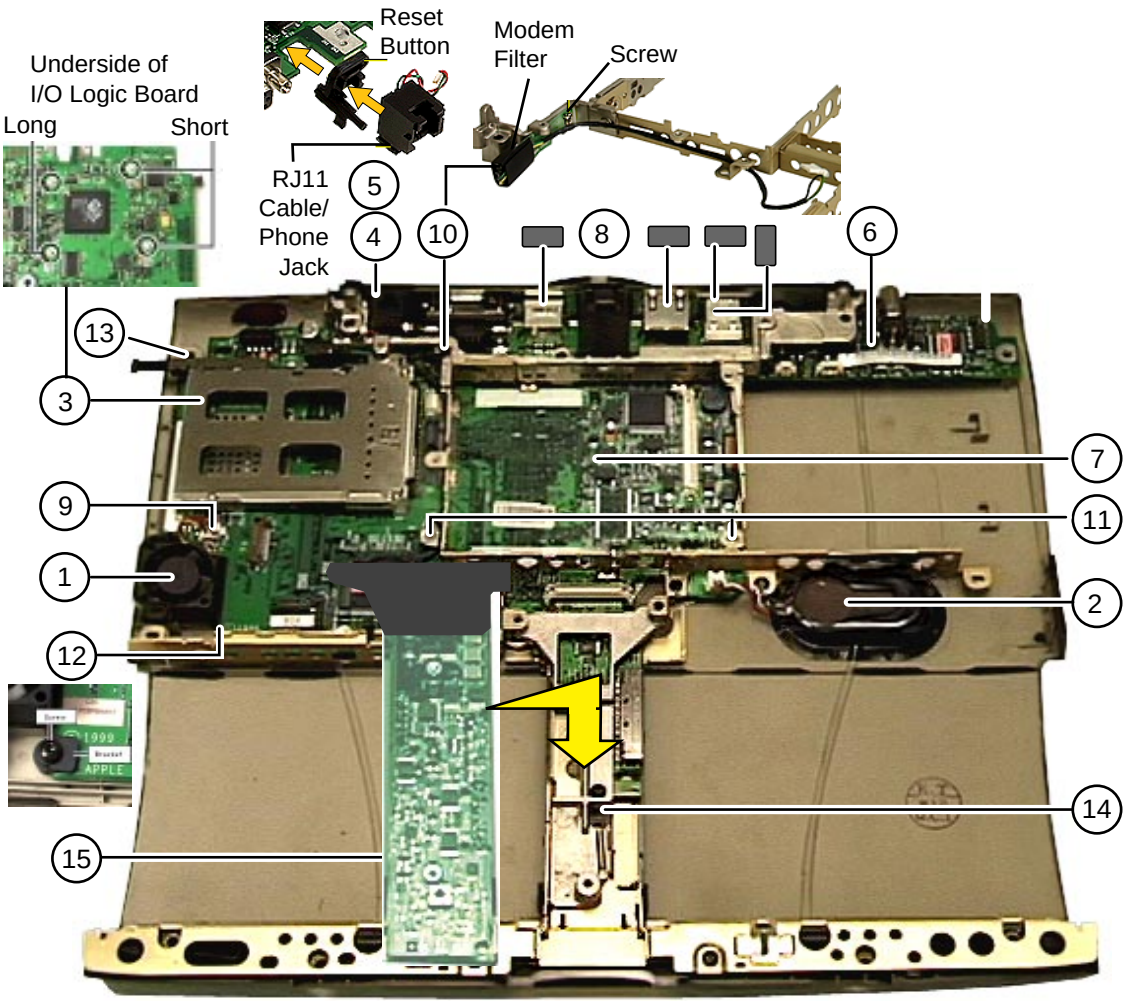
( ) = Total Screws type, [ ]= screws per location
*Part numbers within kit are for reference only and are not orderable.



PowerBook G3 Series (Bronze Keyboard) Reassembly Checksheet

Reassemble the computer in the following order. Match the number to the picture for help in routing cables and locating screws and connectors.

1 Install fan on bottom case.
2 Install backup battery (do not connect cable yet).
3 Install PCMCIA card cage on I/O logic board (4 screws: 2 short, 2 long).
4 Install reset button on I/O logic board.
5 Install RJ-11 cable/phone jack on I/O logic board.
6 Install sound card on I/O logic board.
7 Install I/O logic board on bottom case.
8 Install 1 EMI shield on sound card and 1 each on Ethernet and S-video components.
9 Connect fan to I/O logic board.
10 Install EMI filter card on stiffener (1 screw).
11 Install stiffener (2 screws).
12 Install bracket and screw over I/O logic board.
13 Install nut on back left corner of I/O logic board.
14 Install yoke (1 screw and 1 spring).
15 Install power supply card (2 screws in middle of card).



PowerBook G3 Series Reassembly Checksheet (cont.)

15 Snap top case to bottom case.
16 Connect power and speaker cables to I/O logic board.
17 Install power supply card (2 screws on top of card).
18 Connect trackpad cable to I/O logic board.
19 Tuck power supply card EMI shield under palmrest.
20 Install right stiffener screw.
21 Install screws under clutch cover (5).
22 Install bottom case screws on underside of unit (5 short and 2 long over expansion bay release levers).
23 Connect keyboard cable to I/O logic board.
24 Connect EMI filter board cable to modem.
25 Install modem (2 screws).
26 Install hard drive.
27 Connect hard drive cable to I/O logic board.
28 Install microprocessor board.
29 Connect backup battery cable to I/O logic board.
30 Connect backlight cable to inverter board.
31 Install inverter board on top case.
32 Connect inverter board cable to I/O logic board and route cable.
33 Install display (4 screws behind I/O door).
34 Connect display cable to I/O logic board.
35 Install cushion on power button
36 Install heatsink (3 screws).
37 Install keyboard.
38 Install clutch cover.
39 Install expansion bay modules.